

# Machine and Tool BLUE BOOK

SERVING THE METAL WORKING INDUSTRY SINCE 1906



JULY - 1950

## SPECIAL FEATURES THIS MONTH

Special Report on Knee-type Milling Machines

Shops of the Southern Pacific Railroad

Some Uses of Compressed Air

Other items of interest listed on page 5.

**A HITCHCOCK  
PUBLICATION**

**This is another of the  
"HUNDREDS OF JOBS"  
which can be done on a  
MARVEL Band Saw!**



**MARVEL BAND SAW saved these  
two 4400 lb. castings**

Two sand cores washed out when these giant 4400 pound steel connecting rods were cast, resulting in solid eye ends without gaps. Then came the \$64 question—how to machine out the 1 1/2" slots in the longitudinal center of the eyes which were 22" high and had a wall thickness of 6 1/2".

The Ernest J. Nelson Iron Works of San Francisco, did this "impossible" job easily, quickly and economically, without special tooling, on a standard Model No. 8M 2 MARVEL Band Saw. Two cuts were made in each rod in two hours per cut with tool cost of \$3.06 per rod. The tool was a MARVEL B9-10 Band Saw Blade.

Every tool room, machine shop and maintenance department needs a MARVEL Series 8 Universal Band Saw—not only for innumerable everyday jobs but for the occasional "trick" operations, where its utmost versatility will save many headaches and dollars.

WRITE FOR CATALOG



*These exclusive MARVEL  
features made this  
job easy:*

1. Large, T-slotted work table.
2. Blade feeds into work vertically; work always stationary.
3. Power-pressure feed.
4. Automatic blade tension.
5. Built-in coolant system.
6. Large capacity.

**ARMSTRONG-BLUM MFG. CO.**

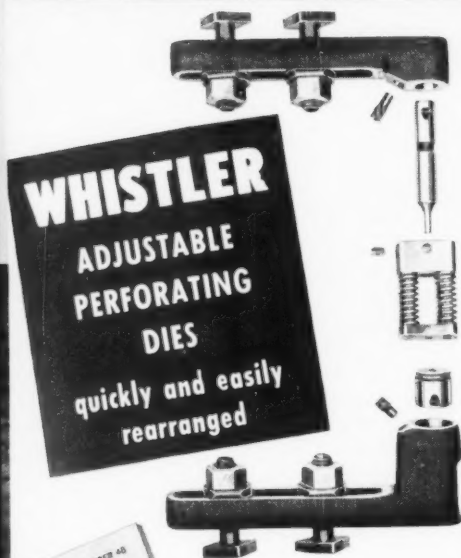
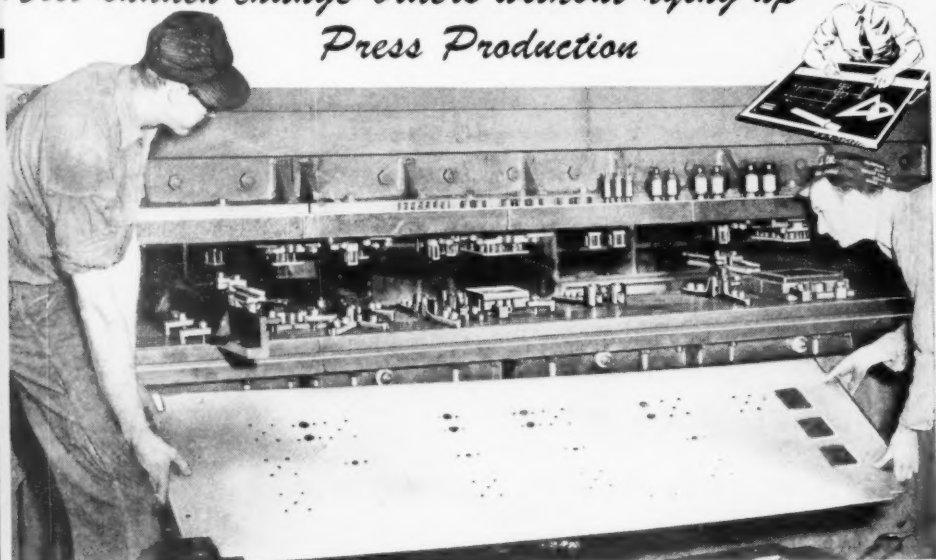
5700 Bloomingdale Ave., Chicago 39, Illinois



**MARVEL** *Metal Cutting*  
**SAWS**  
Better Machines—Better Blades



# Meet sudden change-orders without tying up Press Production



Change-orders from the engineering department usually cause plenty of headaches in production...particularly where die piercing operations are involved.

But, if you're using Whistler Adjustable Dies, there is no lost time—no waiting—no extra die expense. The same dies are easy to rearrange to the new design. Add units from stock, or delete sizes and shapes no longer required. Arrange the new set-up right on the press.

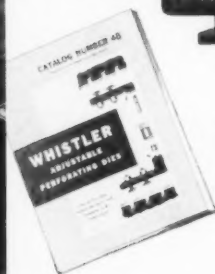
Consider the savings in production time alone. Then think how continued re-use of the same dies in subsequent jobs writes off first cost.

Whistler Dies can be used in practically any press. All parts are interchangeable. Precision is assured on long or short runs. Closer centers permit fewer press operations.

Deliveries are quick...little or no waiting. Standard round punches and dies up to 3" are available from stock. Ovals, squares, rectangles and special shapes can be made up in a few days.

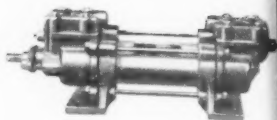
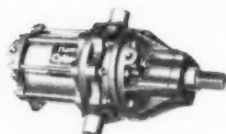
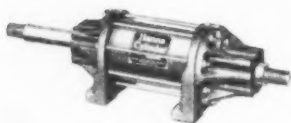
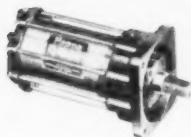
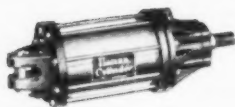
*Write*

for the Whistler  
Catalog today and  
get all the facts.

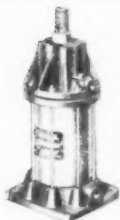


## S. B. WHISTLER & SONS, INC.

760 Military Road • Buffalo 17, N. Y.



**DESIGNED AND BUILT  
FOR FINEST PERFORMANCE..**



**LOW  
PRESSURE**

*... for 1001 applications*



Look for the familiar Hanna Label on the finest cylinders. This name-plate is a symbol of fifty years of manufacturing top-quality pneumatic and hydraulic equipment.

Hanna Low Pressure Cylinders are used throughout industry to supply smooth, dependable, low-cost power for all types of machinery and equipment. Hanna Cylinders are selected to provide the pull, lift, press, clamp or control that is needed. They get the job done quickly, efficiently and economically.

Standard Model Low Pressure Cylinders are designed for operation up to 110 psi., but with minor modifications are suitable for higher pressures with air, oil or water as the operating medium. There is a Hanna Cylinder for nearly every power application and for nearly every mounting requirement ... for many efficient uses in your machines or equipment.

**PNEUMATIC CALCULATOR**

Handy slide Rule of pneumatic information helps in selecting air cylinders.

**NEW CATALOG**

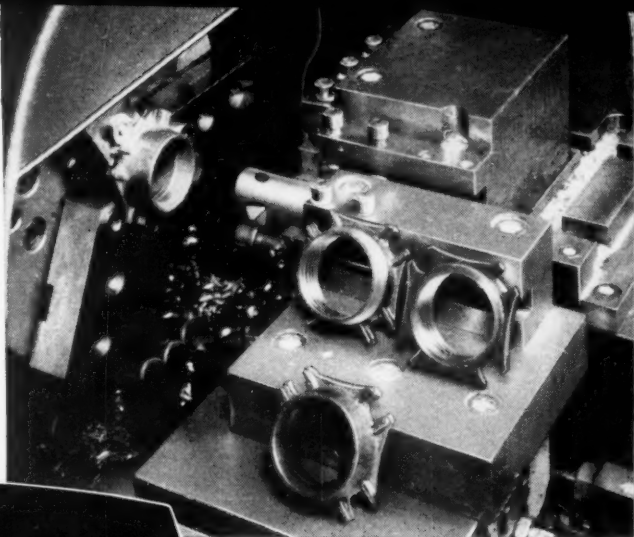
Catalog No. 236 shows complete line of Hanna Low Pressure Cylinders.



**Hanna Engineering Works**

1765 Elston Avenue, Chicago 22, Illinois

# Small Job Shop Catches the BIG IDEA



## *cuts costs with—* **GISHOLT** **No. 12 HYDRAULIC** **AUTOMATIC LATHE**

No matter whether the shop is large or small . . . if there's volume, there's the opportunity to make money faster with automatic machining.

The Kilbourn Engineering Company of Milwaukee saw it—and proved it again—subcontracting these parts for electric hot water heaters with the Gisholt No. 12 Hydraulic.

### **Greater Production**

With its fast automatic cycle and multiple cutting, the Gisholt turns out these parts at twice the rate of the previous method. A man merely loads and unloads the machine. The owner is not limited to this one job either. It is easily set up to handle a variety of work up to 12" in diameter.

### **Corner for Profit**

Such work can be highly profitable for job shops. Especially when the whole operation can be tucked into one small corner of the shop as this one is.

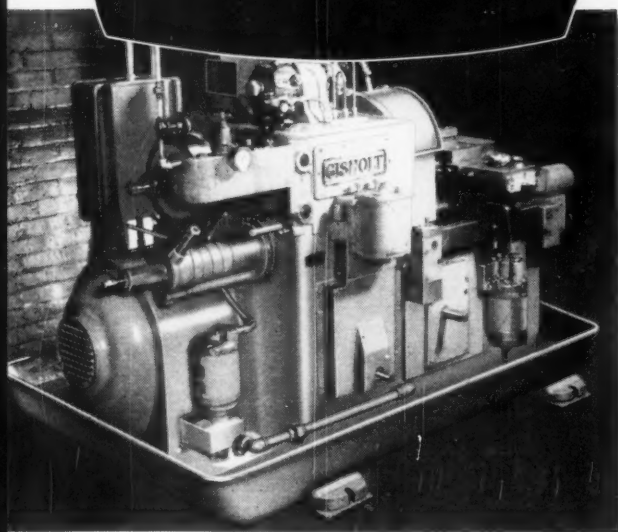
Progressive thinking like this is what makes many small shops grow into big ones. Gisholt engineers can help you with all kinds of ideas for making the most of machine tools.

### **GISHOLT MACHINE COMPANY**

Madison 10, Wisconsin

#### **THE GISHOLT ROUND TABLE**

*represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.*



**TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES**

# ARMSTRONG

## TOOL HOLDERS . . .

### for every operation!

There are ARMSTRONG TOOL HOLDERS in sizes and types for every operation on lathes, planers, cutters and shapers—for the heaviest cuts; for the most delicate cuts.

With Standard shaped cutters, bits and blades of ARMSTRONG HIGH SPEED, ARMALLOY (Cast Alloy) and ARMIDE (Carbide-Tipped) they provide a system of tooling that assures maximum production per machine hour, lower tool costs, and higher machining profits.

These permanent multi-purpose tools can be picked up as needed from your industrial distributor. Use them wherever possible to increase number of pieces per hour, to lower cost per piece.

*Write for Catalog.*

**ARMSTRONG BROS. TOOL CO.**

*"The Tool Holder People"*

5208 West Armstrong Ave., Chicago 30, Illinois



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published monthly • vol. 46 no. 7

july, 1950

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Wm. F. Schleicher • editor

H. Louis Purdy • new equip. editor

Gerald E. Stedman • field editor

Robert R. Hadley • art director

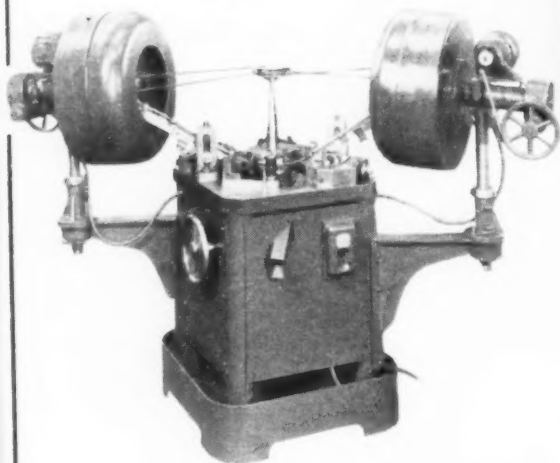
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acceptance under section 34-64, P. L. and R. authorized office • DeKalb, Illinois

Hitchcock District Managers are listed on page 226.

# The Rollmaster



## FOR ACCURATE THREAD ROLLING

Another PRUTTON advanced Model Automatic Machine designed for accurate thread rolling, which meets the enormous planned production schedules necessary in industry today (better than 25,000 pieces per hour).

Rotary in design, THE PRUTTON ROLL MASTER can be easily operated by unskilled workmen.

Write today for full particulars.

## TAP IT WITH A PRUTTON

# Tapmaster

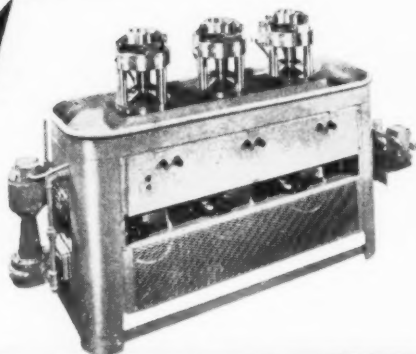
3 TAPPING MACHINES IN 1

The Tapmaster Line handles a complete range of work up to 4".

Production figures vary from 500 to 1500, depending on the type of work to be tapped.

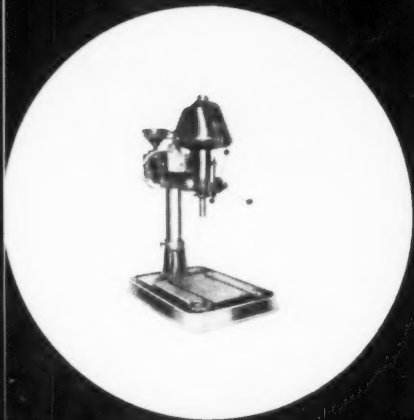
Also available for heavy duty work is the No. 40 Tapmaster. This machine is designed for collapsible tap work up to 4".

Write today for descriptive bulletin.

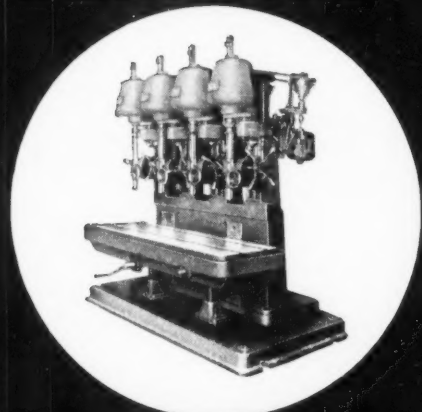


**D. H. PRUTTON MACHINE & TOOL CO.**  
5295 W. 130th St. CLEVELAND 11, OHIO

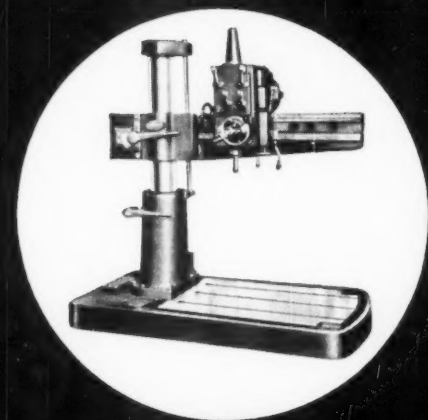




**16" Royal Sensitive Bench Drill, single and multiple spindle. Bulletin 216.**



**21" Box column single head floor drill, multiple spindle. Bulletin 100A.**



**Royal Radial Drill—3', 7" column. Bulletin 116.**

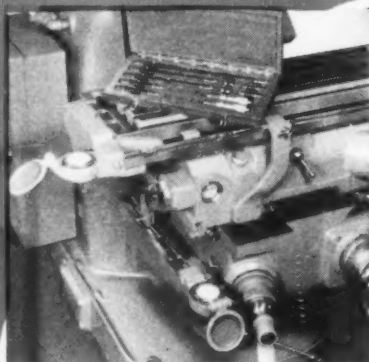
# how to drill an argument full of holes

The familiar "we can't afford it" argument will very likely go to pieces when matched against high money saving productivity and low initial cost in the Canedy-Otto Cincinnati line of light, upright, sensitive and radial drilling machines. They offer the sizes, types, speeds, feeds and adaptability to fit better than 90% of your drilling requirements . . . The Canedy-Otto line is now backed by a leading name in lathe manufacture. Write for latest literature.

**CANEDY  
— OTTO  
DIVISION**

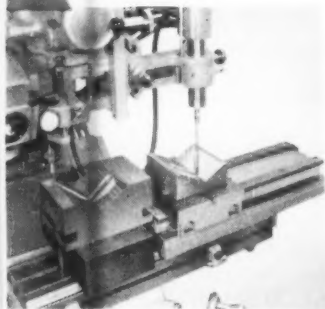
**cincinnati LATHE & TOOL CO**

Cincinnati 9, Ohio



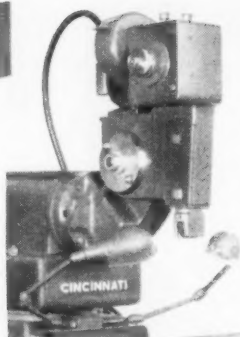
#### PRECISION MEASURING EQUIPMENT

For general-purpose milling operations, including those required to finish the die, where close accuracy of spacing is of prime importance. Guide pin holes and accurately spaced plain milled surfaces can be machined without resorting to conventional "cut and try."



#### RIGHT- AND LEFT-HAND ATTACHMENT

Left-hand dies can be duplicated from right-hand masters, and vice versa. Inventory of master die blocks is thereby reduced; finished right- and left-hand parts will be exactly alike.



#### SLOTING ATTACHMENT

Mounted on the back end of spindle carrier ram. Just swivel the ram 180°, and you're ready to proceed with slotting operations on your CINCINNATI 8" x 18" Tool and Die Miller.

## FOR TOOL AND ...AND CINCINNATI 8" x 18"

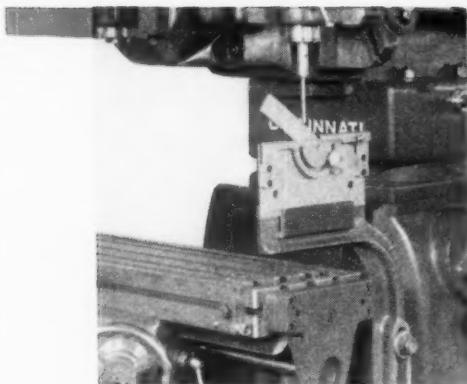
All the attachments illustrated here are applicable to CINCINNATI 8" x 18" Tool and Die Miller, the machine that can do a greater variety of work with less operator effort than any other shop equipment within its range and power classification. More information about this cost cutting toolroom machine may be obtained by writing for catalog M1620-1.

**THE CINCINNATI MILLING MACHINE CO.**

**CINCINNATI 9, OHIO**

# Cincin

MACHINE and TOOL BLUE BOOK



#### PROTRACTOR TEMPLATE

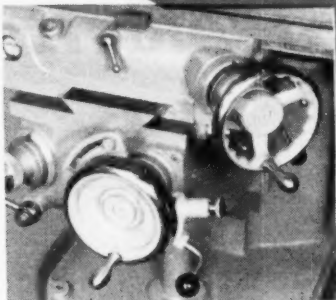
An adjustable angle template device for use with the 8" x 18" having Automatic Depth Control. Eliminates the need for a variety of straight-edge templates.

## DIE MEN ONLY TOOL AND DIE MILLERS



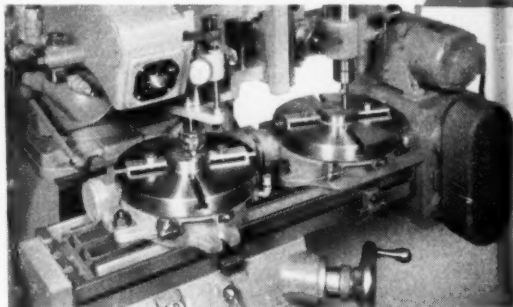
#### DUPLEX ROTARY TABLE ATTACHMENT

Two tables are driven in unison from a single power source. This equipment incorporates an extremely slow power driven cross feed to the saddle. When once set up, the operator can leave the machine while it continues to duplicate intricate stamping dies, glass molds, etc.



#### HAND PICKFEED FOR SADDLE MOVEMENT

A convenient and timesaving feature of the CINCINNATI 8" x 18" which facilitates the indexing of feed progressions. May be adjusted throughout a range of 30 increments, for .001" to .030" progression. Readily disengaged to restore normal use of cross feed handwheel.



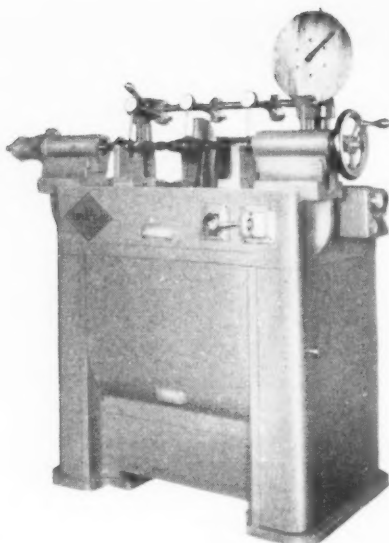
# nati

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES  
FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

# The New **IMPCO** **STRAIGHTENER**

FOR

- **CRANKSHAFTS**
- **AXLE SHAFTS**
- **CAM SHAFTS**
- **ROCKER ARM SHAFTS**
- **TRANSMISSION SHAFTS**
- **OTHER PARTS OF THIS TYPE**



This machine handles all types of straightening operations used on a production basis. It is fast, accurate and efficient. Loading and unloading time is cut to a minimum. To operate, part is placed in machine and air centers engaged (centers are spring mounted), indicator bracket is lowered to register high spot on part, and the proper hook is pulled forward. Palm button is then pressed to engage circuit until large hand on dial comes to the proper setting determined by previous experience. Once the setting of the hand comes to the proper number on the dial, the palm button is released and the hook returns again to center.

Installation of this new straightener raised production of the operation illustrated from 45 camshafts per hour to 200 pieces per hour. Any number of hooks can be used for various types of work. Efficiency of straightening operations has been raised as high as 45% with this machine.

Construction features of the machine include the use of steel weldments for all structural members and the liberal use of Ampco Bronze Bearings. A "one shot" measured lubrication system is provided for all bearings. Easy accessibility to moving parts is provided by means of hinged doors and lift-out panels. External wiring is held to an absolute minimum. This presents a smooth, neat appearance which is easily kept clean as there are no overhead rotating parts to throw grease, or hydraulics to leak oil. Height of machine is so designed as not to interfere with overhead conveyors or other assembly operations.

Specifications: 68" wide by 36" deep; 37 tons capacity; equipped with or without centers; mechanical operation. Your inquiry for information on how the "Impco" Straightener can answer your particular needs will receive prompt attention.



**INDUSTRIAL METAL PRODUCTS CORP.**  
**P.O. BOX 156**  
**LANSING 1, MICH.**

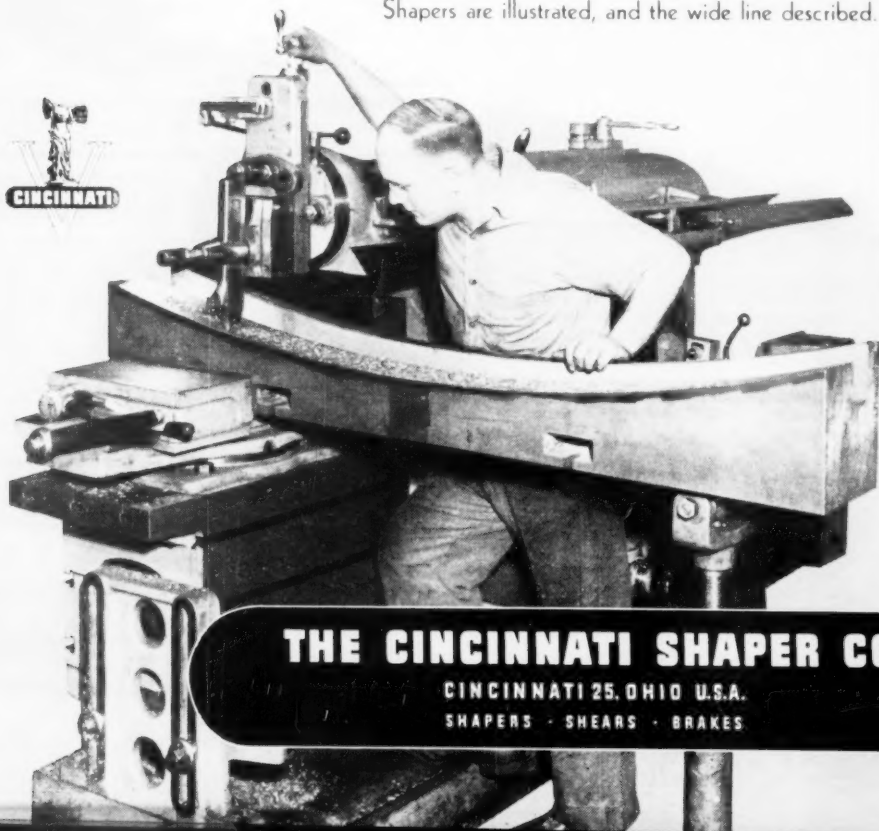
# **contour** the special job on a **Cincinnati Shaper...at low cost**

The special job is often a time-eater—and a cost raiser.

This handy Cincinnati Shaper saves time—saves money—on many special jobs. Little time is lost on setups—costly fixtures and special equipment are not needed.

Contouring this 1200-pound tank stove die—roughed and finished in 4 hours—is done at low cost with simple tools and simple setup. It is an example of many jobs performed on versatile Cincinnati Shapers at lowered costs.

Write for Shaper Catalog N-5, where many uses of Cincinnati Shapers are illustrated, and the wide line described.



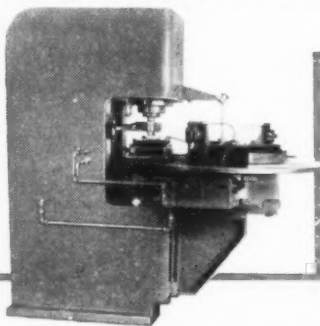
**THE CINCINNATI SHAPER CO.**

CINCINNATI 25, OHIO U.S.A.  
SHAPERS • SHEARS • BRAKES

# NOW! FAMOUS MULTIPRESS

offers safer, smoother oil-hydraulic speed and accuracy

# FOR THOSE BIGGER JOBS



## 15-TON MULTIPRESS WELDS ENDLESS BELTS WITH HEAT AND PRESSURE

This standard 15-ton Multipress is equipped with an Index Table which has a special dial to provide space for large holding fixtures. It welds endless belts together with heat and pressure, allowing the joint to cure during a brief dwell period.

If any of your production jobs are handled with pressures from a few hundred pounds up through the 35-ton range, find out now how MULTIPRESS can cut your costs!

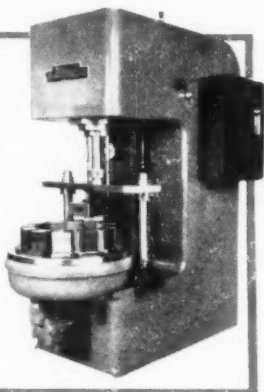
Hundreds of users report eye-opening and sometimes almost unbelievable gains!

Multipress gets unusual results because its advanced valving and controls set a new pace in safe, fast accuracy. And if you want *positive proof* of what Multipress can do for you *before you buy*, your engineers can see Multipress in action on your own production jobs by simply supplying Denison's Testing Laboratory with tooling you use.

Get the full story on Multipress. 1-ton to 35-ton capacities. Standard job-speeding accessories available for many special needs. Write today!

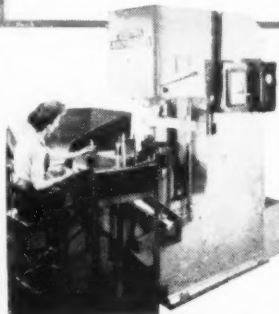
## FAST, ACCURATE BROACHING ON 10-TON MULTIPRESS

At 25 per minute, this 10-ton Multipress broaches serrations on two small shafts at once. Fixtures accommodate two shafts at each index-table station. Broached parts are automatically lifted by a cam within the table housing, for ejection. The widely adjustable ram speed of Multipress is ideal for broaching.



## SPEED DOUBLED ON 25-TON RIVETING JOB

25-ton Multipress, equipped with a standard Multipress Indexing Table, assembles screws in insulator bases at rate of 1500 per hour. Parts index automatically to the ram station, are riveted, loosened from fixtures, and ejected into a chute.

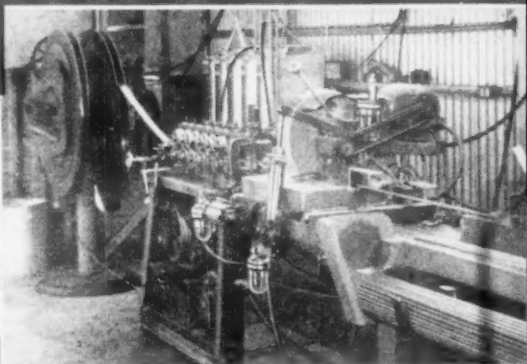
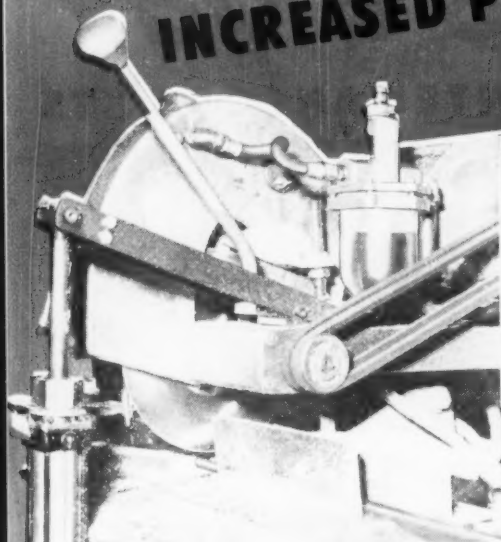


The DENISON Engineering Company  
1184 Dublin Road Columbus 16, Ohio





# How Norgren Oil Fog Lubrication INCREASED PROFIT 4 WAYS!



1. Stopped saw-swabbing by hand.
2. Eliminated a deburring operation.
3. Doubled saw blade life.
4. Reduced lubricant expense 50%.

## ...with these 4 Savings

The UNIVERSAL MOLDING CO. of Lynwood, Calif., developed an automatic machine for their own use in making aluminum molding of many shapes. It feeds strip stock from a roll, punches it, forms it, and cuts it to length by means of a flying cutoff sawing unit. Norgren oil fog lubrication replaces hand-swabbing of the saw. Results: dangerous, wasteful hand operation was eliminated; deburring of cut ends was no longer necessary; saw life increased 100%; lubricant saving of 50%.

**Get Better Performance**  
from your air-powered equipment with **Norgren Lubricators**

Automatic • Develop airborne oil fog • Coat all moving parts • Visible oil feed • Accurate, constant rate of oil flow • Compact, easy to install.



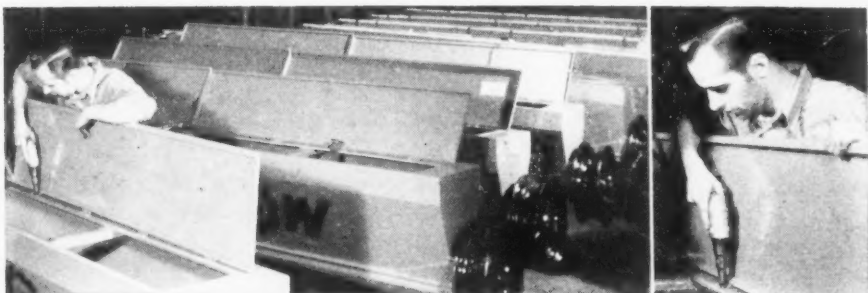
# Norgren

Lubricators,  
Regulators, Filters,  
Valves, Hose Assemblies

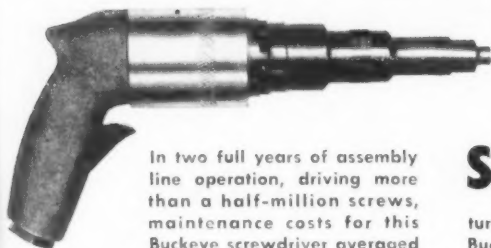
Write C. A. Norgren Co.  
238 Santa Fe Drive, Denver 9, Colorado

# 5 cents a day

## PAYS ALL MAINTENANCE COSTS



on this



### BUCKEYE

### SCREWDRIVER

In two full years of assembly line operation, driving more than a half-million screws, maintenance costs for this Buckeye screwdriver averaged just 5 cents a day . . . after 104 consecutive weeks of continuous service, screwdriver repair parts and labor costs totalled only \$27.20.

This record, established at the Chicago plant of the Firecraft Corporation, manufac-

turers of agricultural equipment, is typical of Buckeye air tool applications in almost every type of industry. Lower tool maintenance costs, and greater productive output per tool, are benefits Buckeye Air Tools can offer you. Want proof? We'll gladly demonstrate in your own plant—without obligation—and let you be the judge.



### NEW!

BUCKEYE  
AIR  
TOOLS CATALOG

Revised and enlarged, packed with helpful information for every user of air tools. Send for your copy today.

WATCH FOR THE *NEW*  
BUCKEYE *C-LINE*



## Buckeye Tools

CORPORATION

DIVISION 14 • DAYTON 1, OHIO

MANUFACTURERS OF AIR AND ELECTRIC TOOLS

*Built to match the POWER  
of your impact tools*

**APEX**

## **IMPACT Sockets and Wrenches**

• The greater power of modern impact tools can increase your productive output—IF the sockets and wrenches used with those tools are built to match that power.

Apex impact sockets and wrenches are designed for continuous, heavy-duty industrial service, and built to stand up under the strains and shocks of impact tool operation . . . to minimize tool wear-out and breakage.

Select the impact sockets and wrenches you need for efficient production from the thousands of standard types and sizes available for prompt delivery from complete Apex stocks. Special applications? Just send your sketch or blueprint—we'll furnish quotations, without obligation.

A note (on your company letterhead, please) will bring your copy of Catalog 19, a complete listing of all Apex plain and universal sockets, extensions and adapters.

**APEX**

## sockets and wrenches

**THE APEX MACHINE & TOOL COMPANY**

1028 S. Patterson Blvd. • Dayton 2, Ohio

Safety Friction Tapping Chucks • Vertical Float Tapping Chucks • Self-Releasing and Adjustable Stud Setters  
Power Bits for Phillips, Frearson, Slotted Head, Clutch Head, Hex Head and Socket Screws • Hand Drivers  
for Phillips, Frearson and Clutch Head Screws • Aircraft and Industrial Universal Joints • Sockets and Universal  
Joint Socket Wrenches.

July, 1950

15

# TAPPING TECHNIQUE No. 7



Did you ever feel sickly . . . and ready to shirk?  
Not able to eat . . . or do one "tap o' work"?



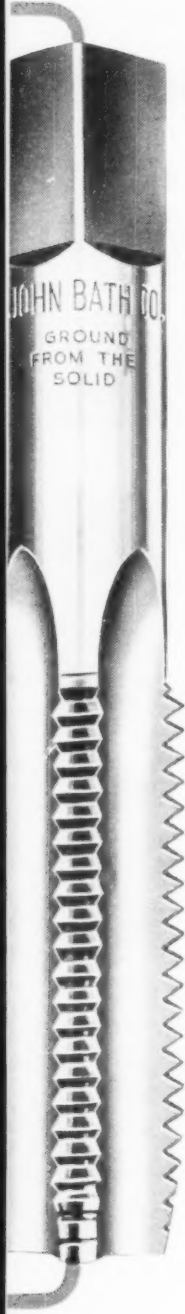
For the right diagnosis, you called a physician —  
Who soon had you back in the pink o' condition!



Don't make yourself sick if you're having "tap trouble"!  
Just ask for our help . . . it will come "on the double"!



Doc Bath will prescribe from his case history file —  
Your production's restored . . . and so is your smile!



## INSIST ON BATH TAPS . . . PROFIT BY THEIR PLUS-PERFORMANCE

Tapping difficulties are often simple — yet illusive! Problems range all the way from bellmouth holes, over or under size holes, tap breakage and chipping to more complex problems such as the proper drives for stud fits in various materials and pressure tight fits for steam, gas and acids.

Our engineers (who long ago perfected the "ground from the solid" Bath tap) have accumulated a wealth of reference data during many years of threading experience. Tell us about your tapping troubles . . . let us help you improve thread quality, increase tap wear-life and reduce tapping costs.

PLUG AND RING THREAD GAGES • GROUND THREAD TAPS • INTERNAL MICROMETERS

# JOHN BATH CO.

INCORPORATED

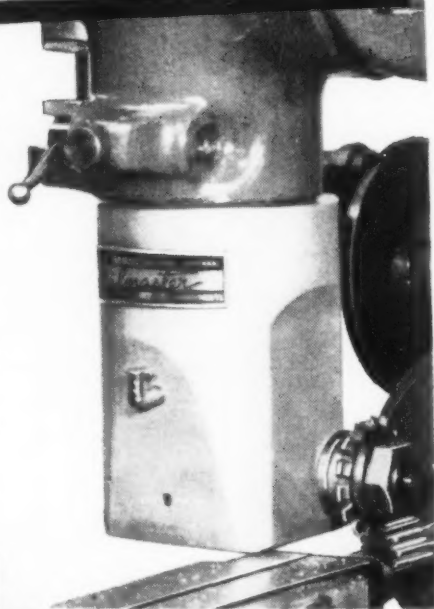
14 Grafton St., Worcester, Mass.

# Milmaster

## PAYS FOR ITSELF IN A FEW DAYS!

YOU CAN convert a horizontal or vertical milling machine into a universal miller... with a MILMASTER. This rugged, precision tool *doubles* your machine capacity... slashes set-up time by as much as two-thirds.

MILMASTER is built by one of New England's oldest metal working specialists and is bringing completely new efficiency and economy in service the country over.



MILMASTER for horizontal and vertical milling machines.

MAIL COUPON NOW FOR  
FULL INFORMATION

BEMIS & CALL COMPANY, 145 Main St., Springfield, Mass.

I am interested in more machine capacity. Please send me full details on the MILMASTER.

Name \_\_\_\_\_

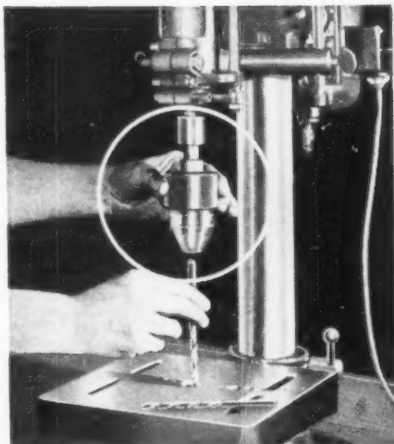
Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

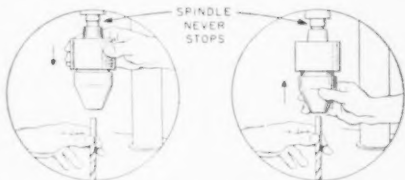


# Change drills in a second, safely with this Automatic Chuck while spindle is running



AMF Wahlstrom Chucks are rugged tools, proven out in many years of heavy production work. Simple construction assures ease of operation.

## HERE'S ALL THERE IS TO CHANGING DRILLS



1. Grip sleeve—pull down—jaws open automatically—drill is released.

2. Insert new drill—push up tapered part—drill is locked in place.

**You don't stop the machine** to change drills with the AMF WAHLSTROM CHUCK. No keys, collets or wrenches are needed.

**That's why Wahlstrom Chucks cut costly minutes** in changing tools for drill press work or for spotting, drilling and reaming in boring or milling machines. They'll also save money in lathe work for burring, turning, filing, etc. *One spindle does the work of several.*

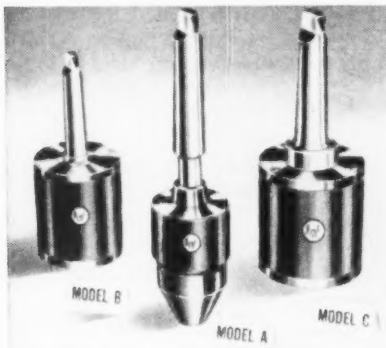
**Tools last longer, too...** smooth, hardened and ground jaws grip tight without chewing into tools. Grip increases with the load.

**For fast, uninterrupted production,** use the quick-change AMF WAHLSTROM CHUCK. It is the only fully automatic drill chuck which holds the widest range of straight shank tools...Model A— $1/32''$  to  $1/2''$ ; Model AA— $1/64''$  to  $3/8''$

See your local distributor or write today for Bulletin 56-4

WAHLSTROM TOOL DIVISION, AMERICAN MACHINE & FOUNDRY CO.  
5502 SECOND AVENUE BROOKLYN 20, N. Y.

## THESE WAHLSTROM TOOLS CUT COSTS, TOO



Wahlstrom Chucks are available in several size ranges:  
Model A— $1/32''$  to  $1/2''$ ; Model AA— $1/64''$  to  $3/8''$   
Model B— $15/64''$  to  $1/2''$ ;  $3/8''$  to  $3/4''$ ;  $17/32''$  to  $1''$   
Model C—Holds any size tool with No. 1, 2, or 3 M. T. Shank.

# WAHLSTROM

fully automatic

# DRILL CHUCKS

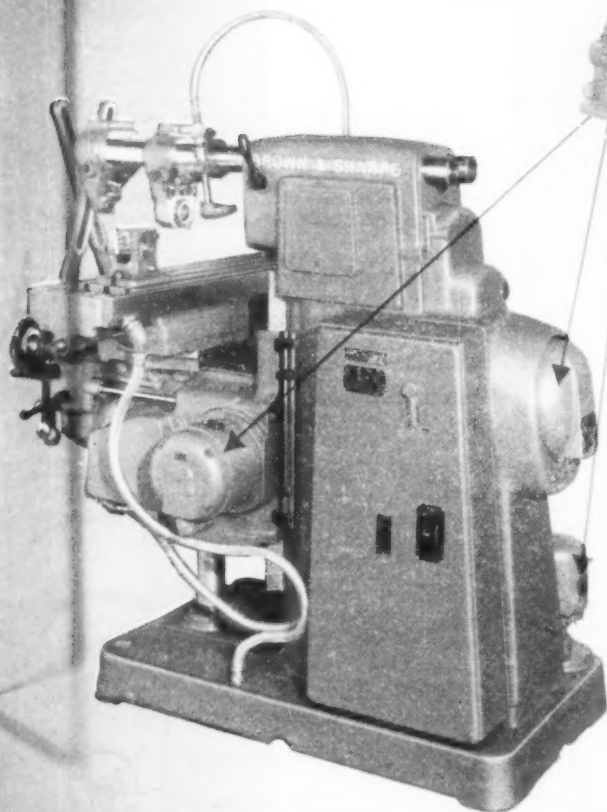
NO KEYS, COLLETS OR WRENCHES



**LONG-ESTABLISHED**

# **User-Bonuses**

**in Brown & Sharpe  
No. 2 Universal and  
No. 2 Plain Milling Machines**

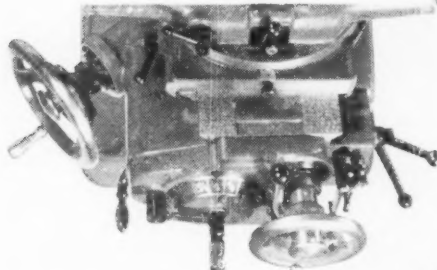
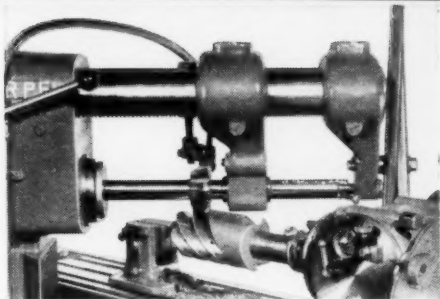


**1**  
**TRI-MOTOR DRIVE**  
**for efficiency . . .**  
**No clutch needed.**

3 individual driving motors . . . for spindle, table, and coolant . . . advantageously placed, save loss of power within machine. Independent spindle motor assures full power for driving cutter. Feed motor coordinated with spindle driving motor . . . thus "start-stop" lever controls not only spindle motor but entire machine. All-gear drive.

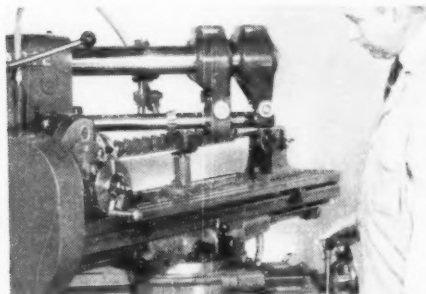
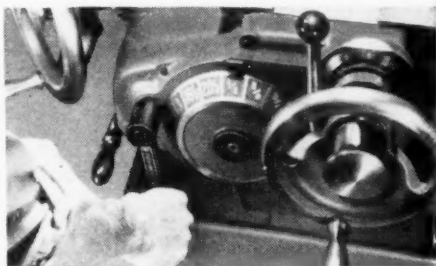
# **BROWN &**

**2** **EXTENDED SPINDLE FACE** for added clearance, greater rigidity of cutter support. Giving added clearance for work and fixtures, this distinctive feature provides maximum cutter rigidity . . . reduces cutter and arbor vibration.



**3** **TIME-SAVING CONTROLS** speed production. Convenient, fan-like arrangement of all operating controls promotes ease and efficiency of operation.

**4** **18 FEEDS—18 SPEEDS** quickly obtained. Choice of feed rates in range where majority of work is milled . . . 14 of the 18 under 10" per minute. 18 changes of speed give suitable cutting speeds for a wide variety of materials.

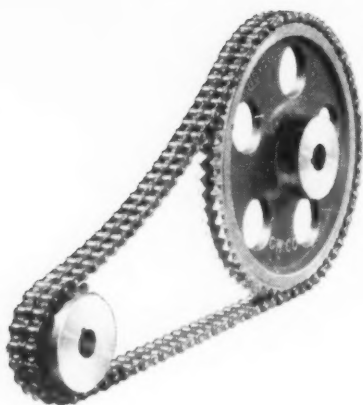


**5** **FAST TRAVEL AND FEED,** same in all directions. Uniform feed rates (longitudinal, transverse and vertical) with uniform 75" per minute power fast travel in direction of feed engaged.

These features are included in both 3 and 5 horsepower No. 2 Universal, Plain and Vertical Milling Machines; except extended spindle face, which is not included in the Vertical model. For descriptive literature or additional information, write Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

# SHARPE





# CULLMAN

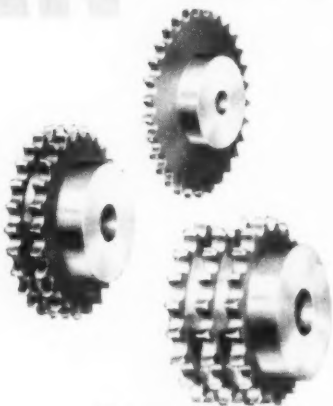
## SPROCKETS

**OVER 80,000 SPROCKETS AND  
80,000 FT. OF CHAIN IN STOCK**

There are important advantages in bringing your sprocket requirements to Cullman Wheel. Chief among these is the fact that in fifty-five years of specialization in the design and manufacture of sprockets and kindred power transmission parts, has

built up the amazing total of over eighty thousand sprockets in stock. Invariably your requirements can be met quickly from this great sprocket and chain inventory. This always brings the cost down. Quick delivery is also available at

Cullman on special made to order sprockets. Send your blue prints for recommendations and estimates.



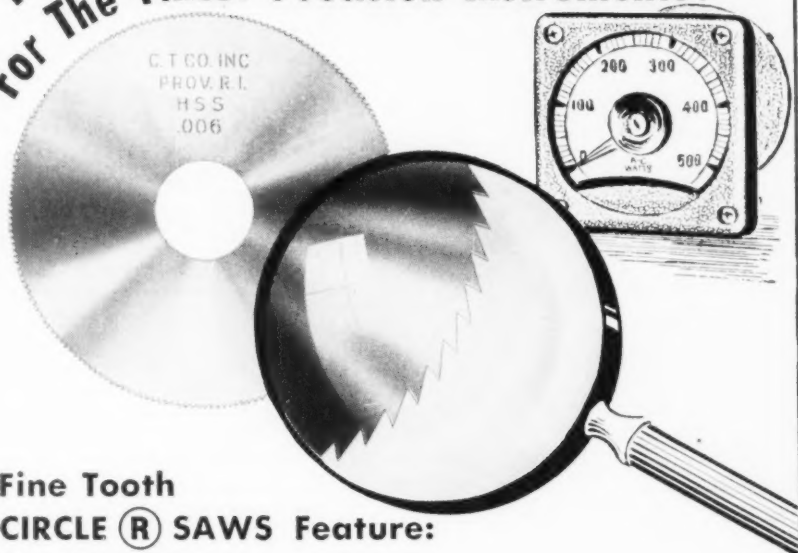
SEND TODAY FOR INFORMATIVE CATALOG

**CULLMAN WHEEL COMPANY**

1350-W ALTGELD STREET • CHICAGO 14, ILLINOIS

# CIRCLE **R** SAWS

**The Finest Teeth  
For The Finest Precision Instruments!**



## **Fine Tooth**

### **CIRCLE **R** SAWS Feature:**

30 teeth per inch

1" to 6" diameters

Thickness .006 in standard sizes; furnished in .003 up to 1½" diameter as specials.

Throughout American Industry these CIRCLE **R** SAWS have provided for years the delicate precision necessary for producing fine measuring, indicating and control instruments.

### **CIRCLE **R** SAWS**

The "Standard" of Saw Quality

## **CIRCULAR TOOL CO., INC.**

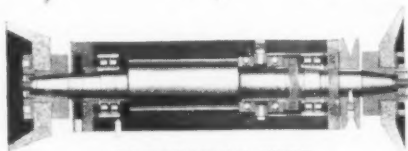
PROVIDENCE 5, R. I.

Chicago • Philadelphia • New York • Dayton • Cleveland  
Los Angeles • Rochester • Indianapolis • Detroit  
St. Louis • Minneapolis

*Specify:*

**POPE**

POPE PRECISION SPINDLES with two double-row, super-precision, cylindrical roller bearings and two separate ball thrust bearings



**CARTRIDGE TYPE**

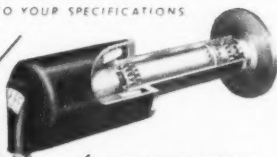


**SPECIAL**

BUILT TO YOUR SPECIFICATIONS



**WHEELHEAD**



**MOTORIZED**

**FOR  
THE MAIN  
SPINDLE  
OF YOUR  
MACHINE**

*Why:*

Because POPE Precision Spindles have more radial and axial rigidity to support the modern, high production cutting tools used for boring, milling, drilling or grinding.

1. POPE Spindles are dependable and trouble-free. *They revolve accurately under the heaviest loads.* This means continuous production of accurate parts.

2. POPE Spindles eliminate chatter

There are no internal clearances between the rotating parts. But there is an internal preload which assures accurate centering of the shaft without depending on the maintenance of an oil film.

3. The indicator readings taken on the noses of thousands of POPE Super-Precision Spindles show less than one half of one ten thousandth (less than 50 millionths) of an inch.

**When you want a Precision Spindle, let us have your specifications and you'll receive a prompt reply including price and delivery**

No. 68

**POPE**

TRADE MARK REG. U.S. PAT. OFF.

**POPE MACHINERY CORPORATION**

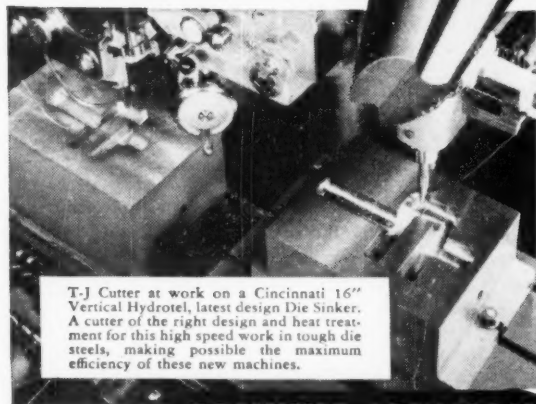
ESTABLISHED 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS  
BUILDERS OF PRECISION SPINDLES



# Turn out **MORE WORK** between grinds with **T-J CUTTERS!**

*Less breakage...  
Lower Cost!*



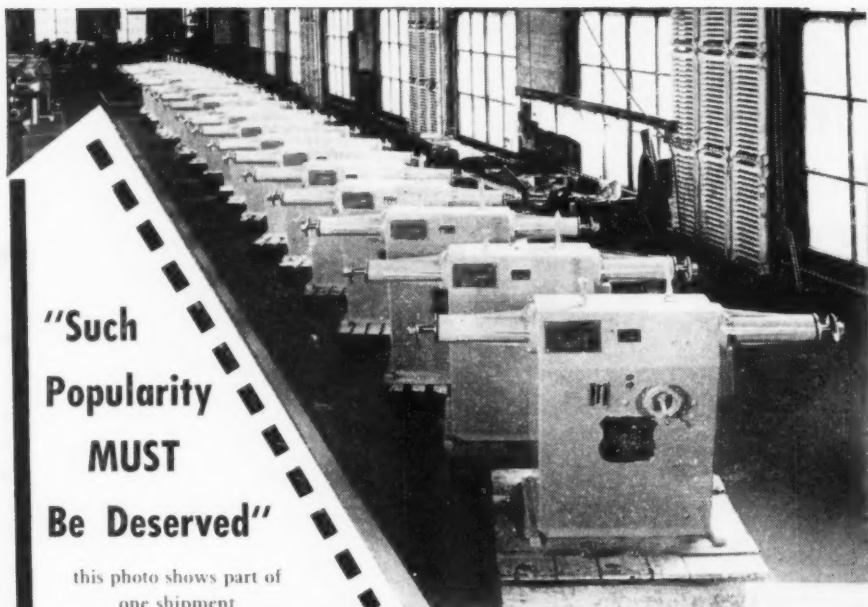
T-J Cutter at work on a Cincinnati 16" Vertical Hydrotel, latest design Die Sinker. A cutter of the right design and heat treatment for this high speed work in tough die steels, making possible the maximum efficiency of these new machines.

**TOMKINS-JOHNSON**  
DIE SINKING MILLING CUTTERS



Your die costs go down . . . and you can raise the feed . . . using T-J Die Sinking Milling Cutters! Their advanced design helps you get utmost *accuracy, speed and efficiency* from your machines. T-J cutters made from a standard, extremely high grade steel . . . properly machined . . . scientifically heat-treated and accurately ground. They're *extra rugged* . . . hold a sharp edge longer . . . less breakage! Wide range of T-J standard styles and sizes. Send for new catalog 150. The Tomkins-Johnson Co., Jackson, Michigan.

**33 YEARS EXPERIENCE**



**"Such  
Popularity  
MUST  
Be Deserved"**

this photo shows part of  
one shipment

## **UNITED STATES VARI-SPEED BUFFING AND POLISHING MACHINES**

"Cameras don't lie" . . . and such an order (shown partially here) means that these machines **MUST BE GOOD** to make good in such a big way. And it proves, too, that **UNITED STATES ELECTRICAL TOOLS** are America's leading line which will **make good for you.**

## **MOST MODERN . . . MOST EFFICIENT**

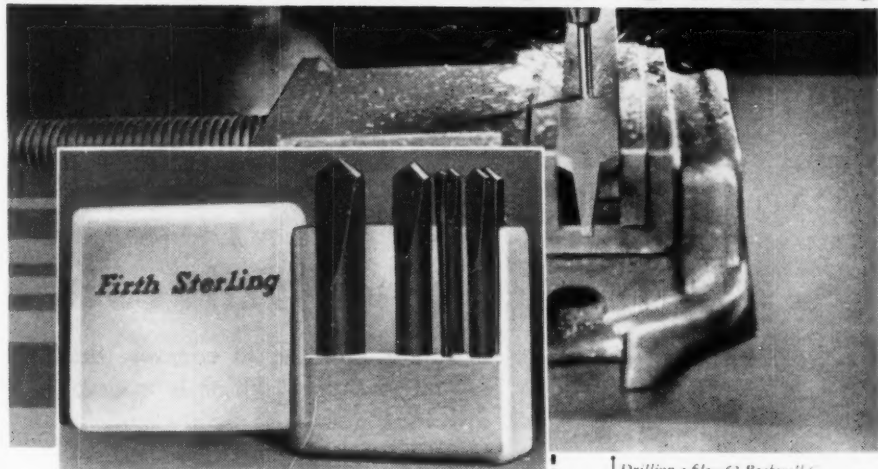
Model 103VS (with one motor) shown here provides correct speed, from 1500 to 3000 rpm, for polishing, buffing, coloring and many other operations requiring exact speed for perfect finish. Speed is adjusted by turning hand wheel speed indicator on front of machine. Four models. Also available with two motors.

Write **TODAY** or ask your jobber  
for newly revised Catalog 59-A.



**The UNITED STATES ELECTRICAL TOOL Co.**  
CINCINNATI, OHIO

# DRILL HARDEST STEEL!



— YOU CAN DO IT  
**BETTER, FASTER, CHEAPER**  
**WITH SOLID FIRTHITE DRILLS**

**BETTER** Minimize distortion and misalignment of drilled holes by HEAT TREATING FIRST, then drilling the hardened metal with Firthite Drills.

**FASTER** Drill clean-cut holes without drawing the temper of hardened metal and eliminate "extra" finishing on the surface of the bore.

**CHEAPER** Low initial cost compared to other types of drills used for similar purpose. Often, drilling a single "forgotten" hole in a hardened die block will pay for the drill many times over!

Assortment of six sizes— $\frac{1}{8}$ ",  $\frac{3}{16}$ ",  $\frac{1}{4}$ ",  $\frac{5}{16}$ ",  $\frac{3}{8}$ ",  $\frac{1}{2}$ " in Plastic Kit and Index Holder. Individual drill replacements available.

Drilling a file—63 Rockwell C Hardness.

**\$36**

FOR KIT  
 OF SIX DRILLS

## THREE WAYS TO BUY FIRTHITE DRILL KITS

1. Buy from your AUTHORIZED FIRTH STERLING DISTRIBUTOR or
2. From your Firth Sterling Sales Representative, or
3. Send Purchase Order, check or money order to

**Firth Sterling**

M&B  
 STEEL & CARBIDE CORPORATION  
 McKeesport, Pennsylvania

Please send ☐ Firthite Drill Kit & HMD to:

NAME

ADDRESS

CITY  STATE

**Firth Sterling**

**STEEL & CARBIDE CORPORATION**

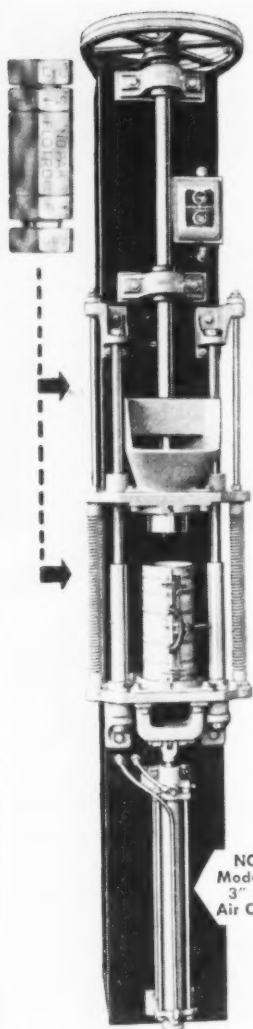
McKeesport, PA.

OFFICES AND WAREHOUSES in Hartford, Cleveland, Detroit, Chicago, Dayton and Los Angeles

OFFICES in New York, Philadelphia and Pittsburgh

IN CANADA: Chaparral Engineering & Sales, Ltd., Hamilton, Ontario

VISIT FIRTH STERLING BOOTH 1024 AT A.S.T.E. SEE HOW FIRTHITE AND FIRTHALLOY "CUT PRODUCTION COSTS"



Arrows indicate location of  
NOPAK FLO-TROL VALVES

Write for  
Bulletin 100

NOPAK  
Model "A"  
3" x 19"  
Air Cylinder

# ACE

## Drain-Tile Machine *employs* NOPAK Cylinder and Valves!

Precision molding of concrete drain tile on an Ace Machine is a simple, efficient, low-cost operation. The Model "A" NOPAK Air Cylinder raises the casing to charging position ... then retracts it at a *slow, controlled speed* while rotary polishing trowel puts a smooth, even finish on interior of the tile. Two NOPAK Flo-Trol Valves control cylinder speed ... in both directions, to insure uniformity of repetitive work-cycles.

This is typical of many work-feed applications in which NOPAK Valves and Cylinders are used.

**GALLAND-HENNING MFG. CO.**

2754 S. 31ST STREET • MILWAUKEE 46, WIS.

*Representatives in Principal Cities*

# NOPAK

## VALVES AND CYLINDERS

DESIGNED for AIR and HYDRAULIC SERVICE

# Pedrick

## PRODUCTION BENDERS

### ARE INEXPENSIVE TO BUY

The Pedrick Production Bender, Model A-5 shown in this picture is, we believe, the lowest priced production machine available on the market. It is powerful too. A clocked production run on 2" pipe, bent one at a time, produced an average production of 300 pieces per hour. Smaller pieces, such as those shown, can be bent in multiple at very much higher production rates. The pieces shown in the picture were 1"

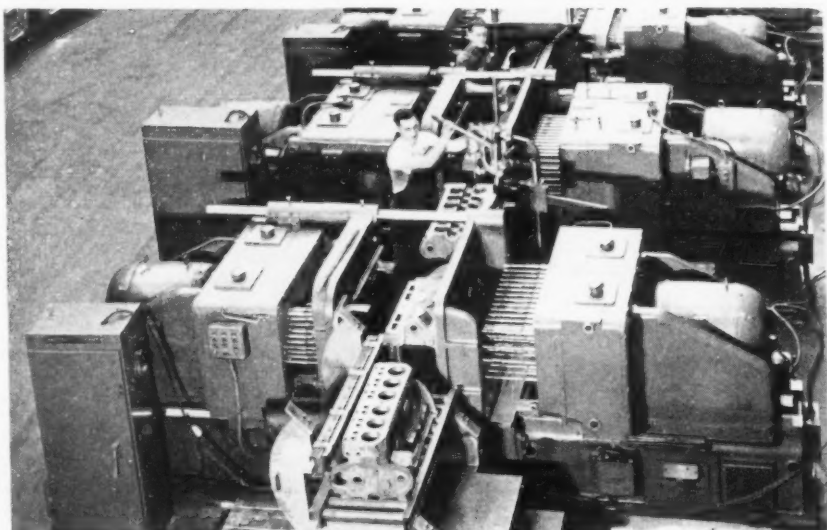
bar stock and the cost per piece was considerably less than 1¢ each. This price includes machine cost, direct labor and shop overhead. The machine will bend pipes, tubes, strips and shapes as well as bar stock.



Write for  
descriptive  
folder

**PEDRICK TOOL AND MACHINE CO.**  
3641 N. LAWRENCE ST., PHILADELPHIA 40, PA.

# FOR PRODUCTION *with* **ECONOMY and EFFICIENCY**



The Herzberg Multiple Drilling and Tapping Head is your answer to high production costs. By cutting change-over time to the barest minimum you avoid costly delays. The Herzberg Head with an unlimited number of spindles, still has single spindle adjustment and can be used on any number of jobs using the same head and spindles. Why not let us show you how the Herzberg Head can cut your production costs.

Please write for our free folders.



## *Herzberg*

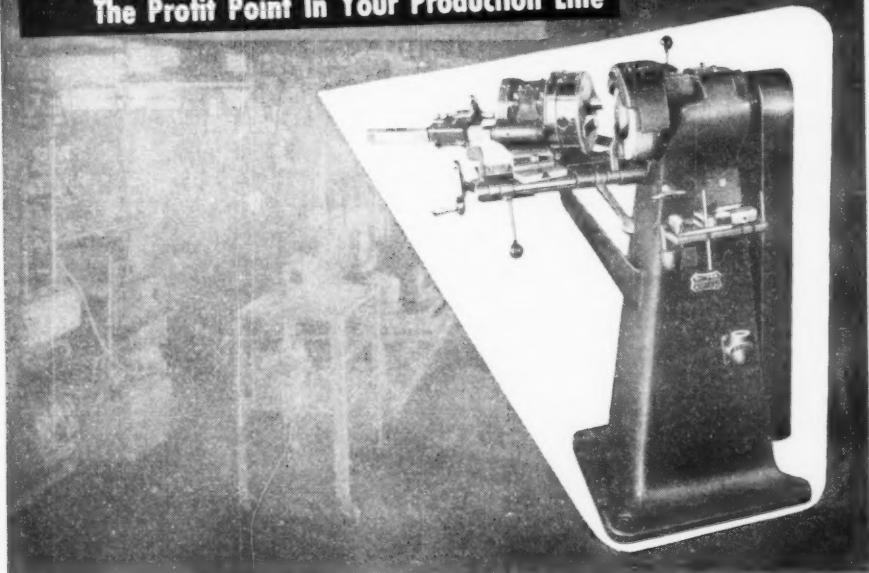
**CORPORATION**

**633 E. CENTER STREET**

**MILWAUKEE 12, WISCONSIN**



**OLIVER MACHINES**  
**The Profit Point In Your Production Line**



## FREE TO YOU

Oliver of Adrian invites you to send them a half dozen of your dull twist drills. Your drills will be sharpened on the Oliver Automatic Drillpointer, free of all costs to you. The Oliver of Adrian Drillpointer will give your drills the highest operating efficiency. 100% or more holes per grind, extend the productive life of the drill and give top accuracy on the toughest drilling job.

The Oliver requires only 60% of the feeding pressure and only 75% of the horsepower to operate as compared to other grinds.

Drills ground on the Oliver Automatic are perfect for multiple spindle drilling because of Oliver uniformity.

The Oliver Drillpointer can be operated by unskilled help. The Oliver will give you the right drill point for every job, increase your profits and reduce production costs.

### MAKE US PROVE IT

Send your drills today. See the results in your own toolroom . . . Remember, no obligation. If you are unable to send your drills, write for complete information on the Oliver of Adrian Automatic Drillpointer.

**OLIVER INSTRUMENT CO.**

**1408 E. MAUMEE • ADRIAN, MICHIGAN**

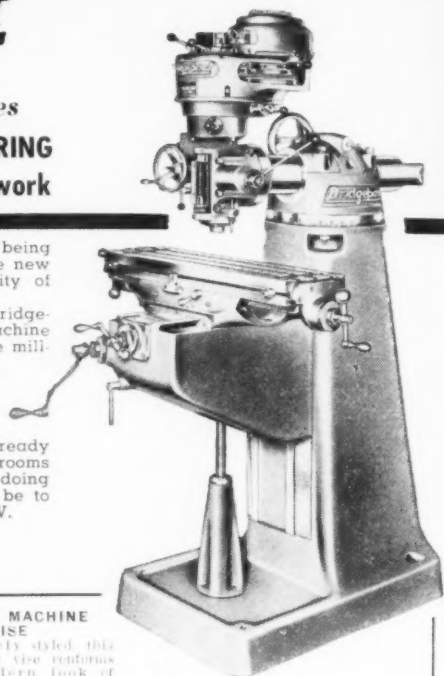
**AUTOMATIC DRILL GRINDERS  
TOOL & CUTTER GRINDERS—DRILL  
POINT THINNERS—TEMPLATE  
TOOL GRINDERS—FACE MILL  
GRINDERS—DIEMAKING MACHINES**

# ***Bridgeport***

**Modernizes**

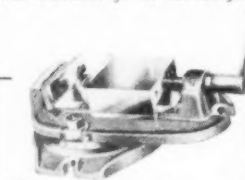
**MILLING, DRILLING and BORING**  
on a wide range of heavier work

Many more classes of work are now being handled on the 'Bridgeport', because the new 1 H.P. head has increased the capacity of this machine for much heavier work. New attachments, too, developed by 'Bridgeport' have extended the utility of this machine so that churning, as well as right angle milling and drilling can now be handled with speed, convenience and accuracy. Convenience and versatility are also extended by the new 'Bridgeport' Milling Machine Vise and Boring Head. More than 12,000 'Bridgeports' are already improving methods and practices in tool rooms and on production lines. What they are doing for others they can do for you. It will be to your advantage to investigate . . . NOW.



## **MILLING MACHINE VISE**

Attractively styled this high quality vise conforms to the modern look of 'Bridgeport' Machines. Great gripping power and rigid holding of work assured by large diameter screw. Two sizes available: 5"x3 1/2" and 6"x5" jaw openings.



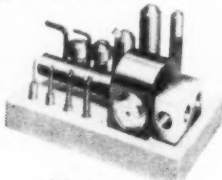
## **HEAVY DUTY RIGHT ANGLE ATTACHMENT**

Designed to mill and drill at right angles. Built in two sizes to fit both the Master and 1 H.P. Milling Heads.



## **LIGHT DUTY RIGHT ANGLE ATTACHMENT**

Specially designed to mill and drill narrow, deep molds and cavities.



## **NO. 2 BORING HEAD**

Designed to fit the new 1 H.P. Bridgeport Milling, Drilling and Boring Attachment. Boring tools with holder are included, making it possible to bore holes up to 6" diameter.



## **CHURNING ATTACHMENT**

Makes possible production of convex and concave shapes. Ideal for producing drop forge dies, molds, cavities, metal core boxes, etc.

# ***Bridgeport*** **MACHINES, INC.**

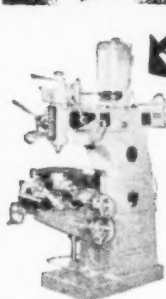
Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

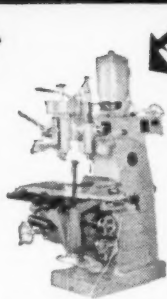


## Send FOR THIS CATALOG GORTON TRACER-CONTROLLED MACHINE TOOLS and Accessories

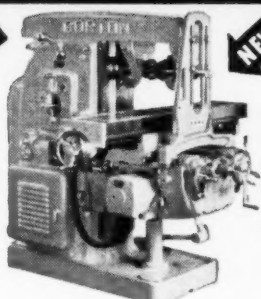
Send for your copy today. Gorton tracer-controlled milling embodies distinct advantages on the production line and in the tool room. In many cases, special tooling will make a given operation entirely automatic. Send for the Gorton General Catalog illustrated above or for any of the other specialized bulletins described below—published for your information and reference.



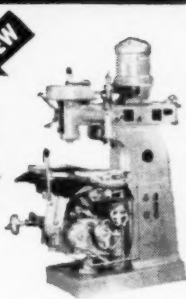
**0-16A VERTICAL**  
Incorporates all of the desirable features of former 8-1D. Also available with swivel or universal head. Bulletin 2240.



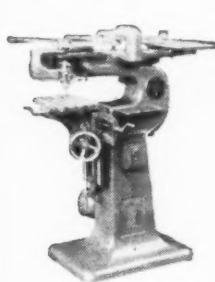
**0-16A DUPLICATOR**  
Rugged, versatile and extra sensitive for exacting die and mold work. Also available with swivel or universal head. Bulletin 1319.



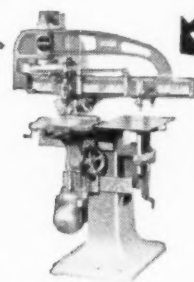
**2-28B HEAVY HORIZONTAL**  
No. 2 Heavy, No. 3 Medium in plain, universal, vertical models. Spindle speeds to 2,000 r.p.m. Full width knee provides maximum rigidity. Request Bulletin 2321 for No. 2 size or 2407 for No. 3.



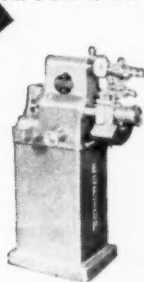
**9-J DUPLICATOR**  
Rugged in construction; has "Gorton super-speed" spindle and sensitive controls for the most exacting work. Bulletin 1319.



**3-U PANTOGRAPH**  
Sturdy and rigid with sensitive tracer control. Larger and heavier 5-Z model also available. Bulletin 1580.



**P13 PANTOGRAPH**  
Ratiobar Pantograph for 3-dimensional work. First basic design improvement in pantograph construction. Bulletin 2510.



**375-2 CUTTER GRINDER**  
Universal type; bench or floor models; capacity up to  $\frac{5}{8}$ " dia., including ball nose and multi-flute cutters. Bulletin 1517.



**16-B AUTOMATIC LATHE**  
For precision turning of long slender parts from .005" dia. by  $\frac{1}{32}$ " long to  $\frac{3}{8}$ " dia. by  $2\frac{1}{2}$ " long. Bulletin 1800.

\*Trade Mark Reg. U. S. Pat. Office

**GEORGE  
GORTON  
MACHINE CO.**

1407 Racine St., Racine, Wis., U. S. A.

*Please  
Send  
at Once*

†Pats. Applied For

For brief facts about the Gorton line of tracer-controlled machines, use coupon or company letter-head and request Bulletin 1655-1406 illustrated above. For specific information on certain machines, see text accompanying each illustration.

Name   
Title   
Address  State

## RECIPE FOR A Better DRILL BUSHING!

take a hole and wrap  
high quality bushing  
material around it for  
longer life ★ lower cost

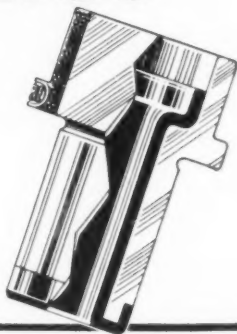


## Revere REVOLUTIONARY DRILL BUSHINGS

Yes . . . that's what we actually do . . . wrap high quality bushing material around a hole and presto . . . Revere Revolutionary Drill Bushings are born.

Revere bushings have all the accuracy of solid type bushings with a wearing surface of high grade material. Assembled in a die cast body.

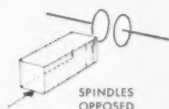
Revere bushings last longer . . . lower cost . . . A new service . . . and are assembled from complete stocks near you.



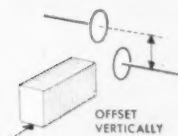
**Revere Fisher**

ENGINEERING COMPANY  
LEXINGTON, MICHIGAN

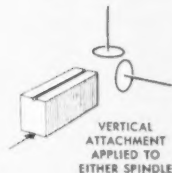
you can do this



or this



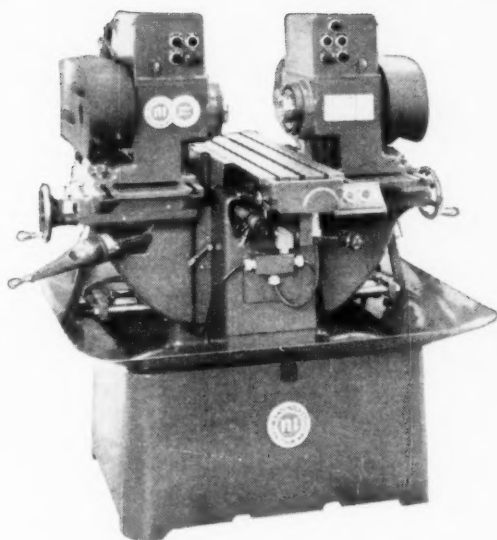
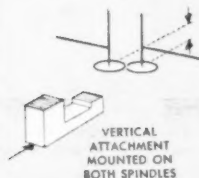
or this



or this



or this



## on the NEW *Nichols* TWIN MILL

The TWIN MILL cuts milling costs in half on many jobs. It handles **TWO** milling operations at a time, yet requires but **ONE** fixture and **ONE** operator. Designed for the class of work usually assigned to Hand Millers or light Automatic Production Millers, the Twin Mill's speed, accuracy, and exceptional flexibility add up to increased output at lower cost. **New** Spindle Retraction automatically withdraws cutters at the end of each cutting stroke. **New** Spindle Brakes act instantly after cycle is completed. The Two Milling Heads are independent units with individual motor drives, quickly adjusted UP or DOWN, IN or OUT, or OFF-SET longitudinally. Machine handles short run or long run work economically. Automatic table cycle and entire machine push-button controlled. Write for details.

### CONDENSED SPECIFICATIONS

Table, working surface	8 1/2" x 30"
Table, travel—cutting stroke	11 1/2"
Motors	(two) 1 HP
Maximum height center of spindle above table	11 1/2"
Maximum offset of spindles (horizontal)	8 1/2"
Maximum distance between spindle noses (across table)	16"
Floor space required	64" x 56"
Spindle Speeds (15)	from 55 to 2050 R.P.M.

Manufactured by W. H. Nichols Co., 48-G Woerd Ave., Waltham 54, Mass.

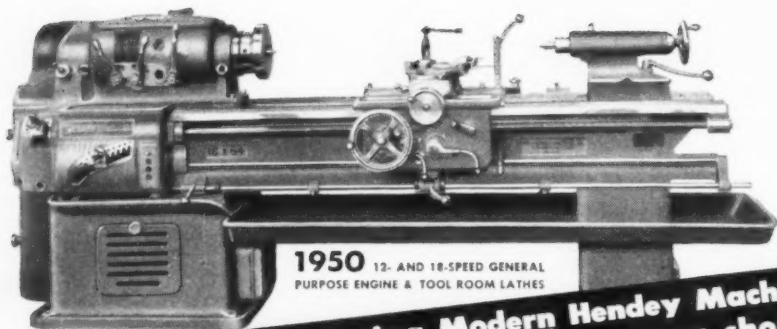


Also available are NICHOLS Hand Millers, NICHOLS two-spindle millers with identical or opposed spindles, and with or without pneumatic feed.

Please address inquiries to

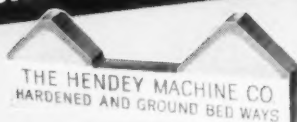
**NICHOLS-MORRIS CORPORATION**

50-G CHURCH ST.  
NEW YORK 7, N.Y.



**1950** 12- AND 18-SPEED GENERAL  
PURPOSE ENGINE & TOOL ROOM LATHES

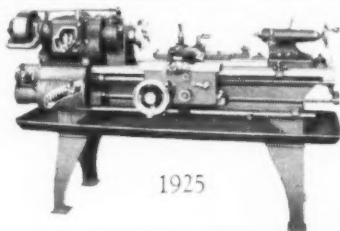
**... If you are not using Modern Hendey Machines  
you are not earning the profits that you should!**



**H**endey Engine and Tool Room Lathes have been, and always will be, tops for accuracy. But, are you aware of the many other modern features of the new Hendey line? Like all Hendey Lathes, the 12- and 18-speed now have induction hardened and precision ground bed ways for both carriage and tailstock. Every important unit has fully automatic lubrication. The rear end of the spindle is graduated for indexing when cutting

multiple threads, and there are 36 thread and feed changes. The precision, all-gear headstock is powered from a built-in motor in the cabinet leg. Spindle speed ranges from 19-1000 R.P.M. A choice of cam lock or long taper key drive spindle noses. Modern Hendey Tool Room Lathes are available with swings of 9", 12", 14", 16", 18", 20" and 24". Write today for full details and complete specifications.

**T**his 8-speed Hendey Engine Lathe has long been obsolete by the all-new Hendey 12- and 18-speed lathes. The 8-speed bed is not hardened and precision ground. Maximum spindle speed is only 426 R.P.M. Although a masterpiece of design and construction in its day, the 8-speed has been replaced by progressive manufacturers, because the 12- and 18-speed offer every modern improvement necessary to earn maximum profits.



1925

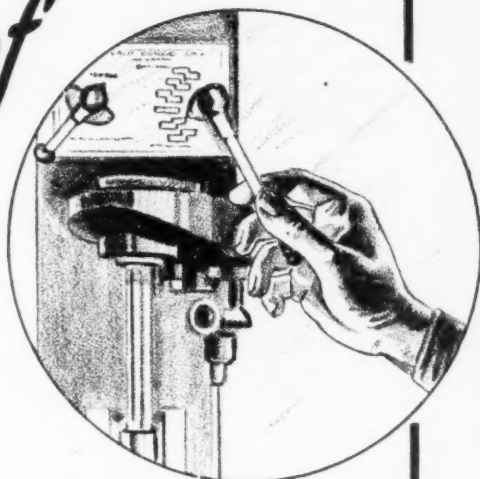
✓ Continuous, advanced engineering by Hendey is worth watching — and must be watched if you are to earn full profits from your lathes and shapers. For complete particulars and prices, contact your nearest Hendey office.

**MODERN** *Hendey*

THE HENDEY MACHINE COMPANY  
MAIN OFFICE & PLANT TORRINGTON, CONN.  
BRANCH OFFICES: New York, Chicago, Boston, Detroit,  
Rochester, Los Angeles, San Francisco  
REPRESENTATIVES: Philadelphia, Cleveland, Pittsburgh



*The Touch of  
a Lever...*



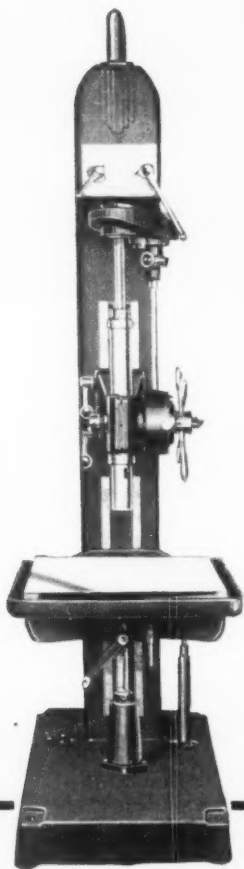
**—GIVES YOU INSTANT SPEED  
CHANGE WHEN YOU DRILL  
WITH THE "RPMster"**

No shutting off the motor, no delay at all when you want a different drilling speed! The operator simply selects the desired speed—instantly—by moving the control lever. The "RPMster" Variable Speed Drive does the rest. It's just one of the many cost-cutting features in this and other "Buffalo" Drills which are setting production records all over the world. Write for the facts on stepping up **your** drilling profits.

**BUFFALO FORGE COMPANY**

161 Mortimer St. Buffalo, N. Y.

CANADIAN BLOWER & FORGE CO., LTD.,  
KITCHENER, ONTARIO



**"BUFFALO" INDUSTRIAL DRILLS**

# PORTER-CABLE ABRASIVE BELT MACHINING

**Does More Surfacing Jobs  
FASTER and BETTER**

Features high speed cutting by millions of abrasive points imbedded in a continuous belt, cooled and cleaned by water and other coolants. Does close tolerance work on flats, squaring, cylindrical surfacing; deburrs, knocks off corners, forms radii, bevels and other operations. Often does milling, shaping, grinding operations 10 times faster — saves 75-90% set-up time.



## PLATEN OR FREE BELT

Model B-6W. Quickly adaptable to flat, curved or irregular pieces. Various shaped platens form the flexible abrasive belt to fit many shapes of work. Free belt reaches inaccessible spots.



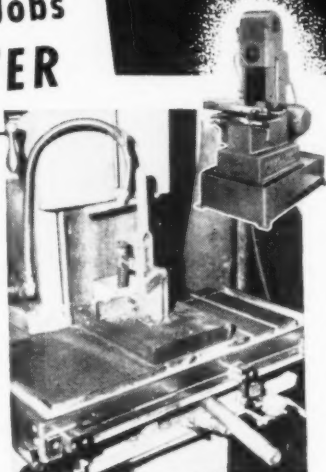
## CONTOUR GRINDER

Model C-6. For curved or flat face grinding or polishing. Flexible abrasive belt runs over shaped contact roll. Loaded abrasive wheel no longer necessary. Wide-range adjustments easy for varied work. Saves set-up time and reworking of piece.



## FINAL FINISH

Model WG-4. For production runs on small parts, fed freehand or by simplest fixtures. Gives final finish to jobs done on automatics, hand and hacksaws, lathes, milling machines, etc. Grinds carbide tipped tools.



## Over 4 Times the Cost of the Original Machine Already Saved by BG-8 with Automatic Feed

A manufacturer of aluminum switches and conduit boxes achieved an amazing step-up when he replaced milling with a Porter-Cable BG-8, Automatic Feed. Before, he produced 25 boxes an hour — he now produces 100 an hour. He has already saved over four times the cost of the original machine. Details upon request.

*Free!*

Let us prove that Abrasive Belt Machining (wet and dry) can reduce cost of many operations. Send us samples for recommendations — or ask to have our engineers discuss your problems at your convenience, at your plant.

**PORTER-CABLE Machine Co. 2747 N. Salina St., Syracuse, N.Y.**  
Manufacturers of **SPEEDMATIC** and **GUILD** Electric Tools  
In Canada write: Strongridge, Ltd., St. Catharines, Ont.

120 to 150 pcs. per min.

produced on this Hartford Special

# AUTOMATIC THREAD ROLLER

Completely Automatic Feed

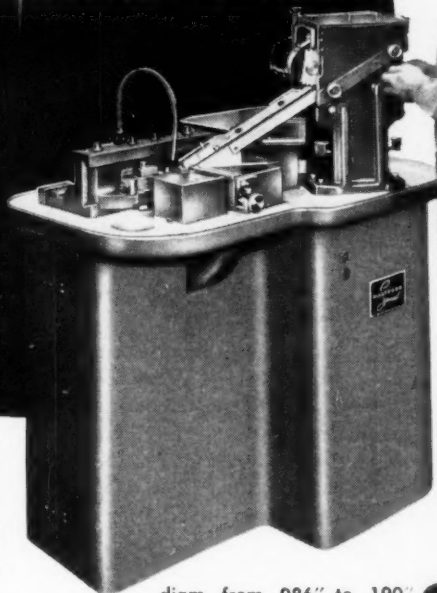
Filtered Lubrication

Table Top Working Level

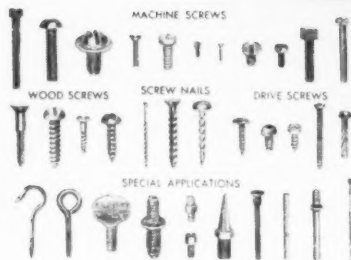
Vibration Free Operation

Quick, Easy Set-ups

Class 3 Fits



diam. from .086" to .190"  
thread lengths from 1/8" to 1 1/2"



WRITE FOR BULLETIN NOW!

**HARTFORD**

*Special*

... the best buy in the long run

THE HARTFORD SPECIAL MACHINERY CO.  
287 Homestead Ave., Hartford 5, Conn.

Please send me free Bulletin TR-100 describing your Automatic Thread Roller.

Name \_\_\_\_\_ Pos. \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



## Ask the Man with Holes in His Head!

### ... to cut your boring costs

What'll it get you to ask about boring? Just this — lower costs. Lower costs through savings in time and money. Because "the men with holes in their heads" provide newer, faster, lower cost methods of boring. You may need special bars and special cutters. If so, they'll be designed for you. More likely the right standard Madison cutter in the right Madison bar can give you full production economy . . . and the Madison line of boring tools is broad enough to fit nearly any boring problem. Why not let Madison — experienced specialists in boring and boring only — cut your boring costs? Ask us. A brief letter will do it. No obligation of course.

#### BETTER BORING TOOLS

Madison's two-bladed cutter provides generous chip clearance — permits faster cutting without overheating. It floats in a Madison bar, special floating tool holders are never needed. More holes per cutter and more regrinds per cutter. Cutters can be changed without disturbing setup. Tolerances to .0003. These and other Madison features cut your boring costs.

#### MORE BORING EXPERIENCE

Literally thousands of boring jobs have been solved by Madison in the past thirty-five years. With this experience to draw upon, Madison can give you the right answer, sooner. Which means your savings from lower cost production begin sooner, too.

*Write for the information filled Madison Catalog. It is yours for the asking.*



# MADISON

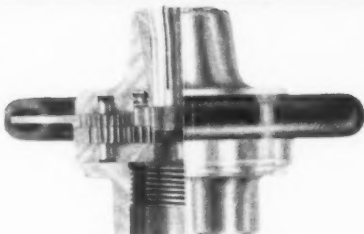
MANUFACTURING COMPANY

DEPT. BB

MUSKEGON, MICHIGAN

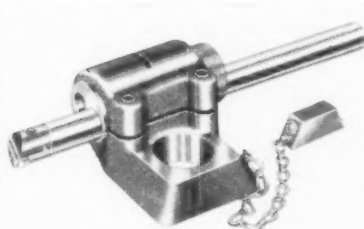
# the **TOOLMAKER** line

- For Collet Chucking
- Lathe Boring ● Angular Setups



**Collet Type Speed Chucks**

- Increase capacity up to 40% by elimination of draw tube and sleeve inside.
- Eliminate use of wrenches and chuck keys as handwheel quickly opens and closes collets.
- Fit all lathes and spindles.
- Insure accuracy through precision collets in precision chucks.
- Five sizes from 1" to 3 1/2" collet capacity.
- Priced from \$79 for 1" capacity.
- For full details write for specification sheet No. 1.



**Lathe Boring Bar Holder**

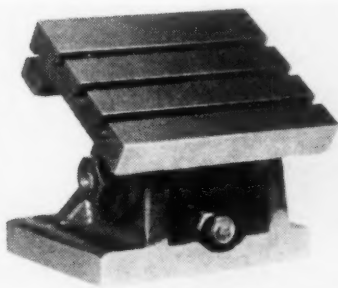
Eccentric adjusting barrel assures parallelism in adjusting these lathe tools. Model d clamps in your tool post turret.

Mod No.	Lathe	Max. bar	Price
a	bench	3/4"	\$11.50
b	8-12" swing	1"	19.50
c	11-20" swing	1 1/2"	29.50
d	Tool post turret	1"	19.50

**Boring Bars**

Diameter & Length	Price
1/2" x 7"	\$3.95
3/4" x 7"	7.95
1" x 7"	9.95
1 1/4" x 7"	11.95
1 1/2" x 7"	13.95
1 3/4" x 7"	15.95
2" x 7"	17.95
2 1/4" x 7"	19.95
2 1/2" x 7"	21.95
2 3/4" x 7"	23.95
3" x 7"	25.95

Send for specification sheet No. 3 on milling machine type offset boring, facing and grooving heads.



**Adjustable Angle Plates**

Quickly set up for any angle between 0° and 90°. Made of normalized grey iron. Adjusting mechanisms are hardened and ground. Models b and c equipped with 360° swivel base.

Model No.	Size	Price
a	3" x 3"	\$29
b	7" x 10"	\$53
c	8" x 12"	\$69

Send for specification sheet No. 2 on sine, multi-swivel, and heavy duty type plates.



## Clip This Ad for Prompt Delivery!

We have circled the items we want for a 10 DAY FREE TRIAL. If satisfied we will forward company purchase order.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

Send catalog too.

## Catalog Includes:

- Machine Tool Attachments
- Work Holding Fixtures
- Surface Plate Equipment
- Light Machine Tools

Send for this catalog today



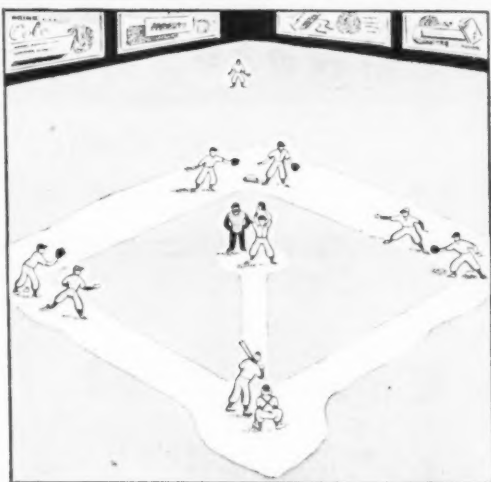
**MONTGOMERY & CO., Inc.**

55 Park Pl., N.Y. 7, N.Y.

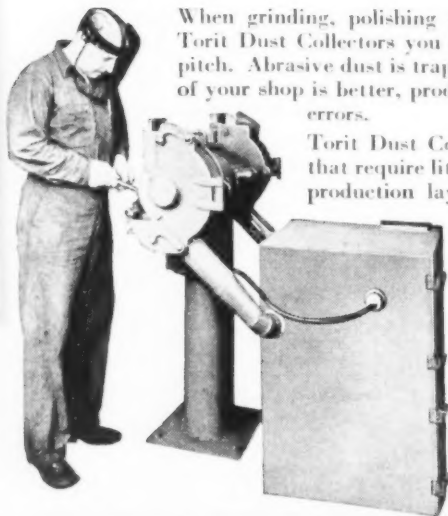
## What Should Catcher Do?

*Ninth inning. Tie score. Two out. Men on first and third. Man on first attempts to steal second. Should catcher throw to second or third?*

*Answer: Under these circumstances man running to second is unimportant. Catcher fakes throw to second, and then attempts to catch man at third.*



## There is no question what you should do to catch abrasive dusts with **TORIT DUST COLLECTORS**



When grinding, polishing and cut-off machines are equipped with Torit Dust Collectors you have a catcher that doesn't miss a single pitch. Abrasive dust is trapped before it can get off base. The morale of your shop is better, production records go up, and there are fewer errors.

Torit Dust Collectors are compact, self-contained units that require little space. They fit into present and future production layouts. They are efficient, economical to install and maintain, and low in operating costs.

Torit Dust Collectors are stocked for immediate delivery. For details and the latest Torit catalog, write:

# **TORIT**

**Manufacturing Co.**  
303 Walnut St. • St. Paul 2, Minn.





# PRECISION BORING... *AT YOUR PRICE* *with a* **MASTUR**

● **ACCURACY** to 0.0002" is the outstanding feature of MASTUR boring tools. They are designed to perform a wide range of rough and finish boring operations on milling, drilling and boring machines as well as automatics at a price you're willing to pay.

Three sizes of MASTUR tools are available for boring holes up to 15" in diameter. Shanks are interchangeable. Full off-set in either direction is feature of dovetail construction. High-carbon chromium steel adjusting screw is precision ground from solid and the dial is graduated into 50 divisions. These dial markings together with tool body calibrations assure accurate vernier readings up to 0.0002".

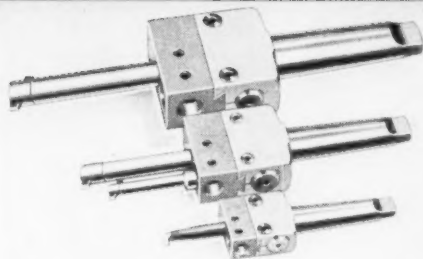
*Guaranteed unconditionally*, MASTUR boring tools unique construction provides a compact, durable and sturdy tool designed to give years of dependable operation under all shop operating conditions.

MASTUR No. 5 has 0 to 7" capacity.

MASTUR No. 6 has 0 to 11" capacity.

MASTUR No. 7 has 0 to 15" capacity.

All MASTUR boring tools utilize standard B&S and Morse tapers as well as straight shanks. Other shanks are available on request.



## PRICES START AT \$44.00

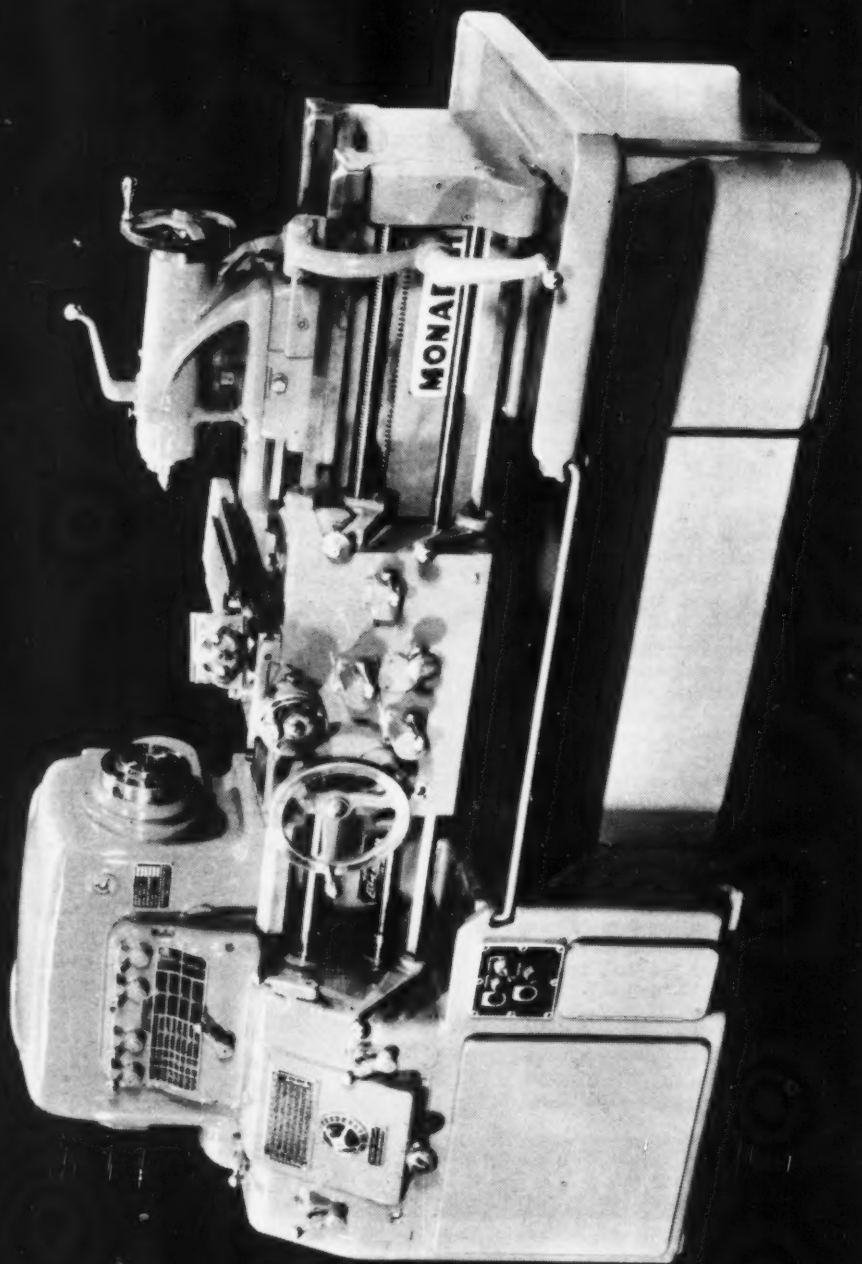
Write today for  
catalog No. MPBH  
for complete data.



MAXWELL RECESSING tools  
are described in catalogs  
No. R and JF. Write today.

# THE MAXWELL COMPANY

221 BROADWAY  
BEDFORD, OHIO

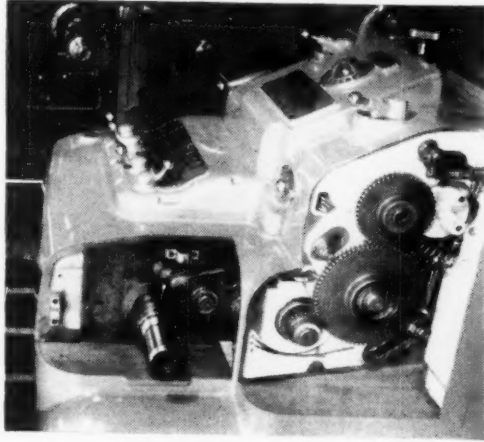


# SEE THESE NEW SERIES 60 LATHES... AND SAVE!

... with longer life, at sustained original accuracy, preserved by totally-enclosed gearbox and end gearing. This Monarch design "plus" permits the use of automatic pressure lubrication to both. The result is years of attention-free operation, with factory-fresh precision and efficiency.

Total enclosure of these vital parts reduces normal servicing requirements to a minimum, and equally important, prevents accidental introduction of foreign matter of all kinds.

Only the Monarch Series 60 engine and toolmakers' lathes have this exclusive combination of enclosed gearing—and this is just one of many design and construction features that mean more savings with Monarch's Series 60 Machines—available in 14", 16" and 20" sizes. You'll save on operation, you'll save on maintenance. Like more facts? Ask for Booklet 1113,



Totally-Enclosed End Gearing

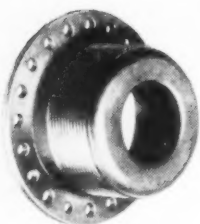
**You'll Save on Maintenance and Operating Expense With These Series 60 Features:**

1. Totally-enclosed gearbox and end gearing—preserves accuracy.
2. Automatic pressure lubrication—insures long life at original efficiency.
3. All anti-friction bearings—for peak power and less maintenance.
4. Hardened, ground or shaved, wide helical gears in headstock—for precision power, easier shifting.
5. American Standard Camlock spindle Nose—for quick, rigid chuck and fixture mounting.
6. Flame-Hardened and Ground Bedways—preserves accuracy—proved on over 25,000 Monarch Lathes.
7. Induction hardening of many critical parts—for long, trouble-free life.



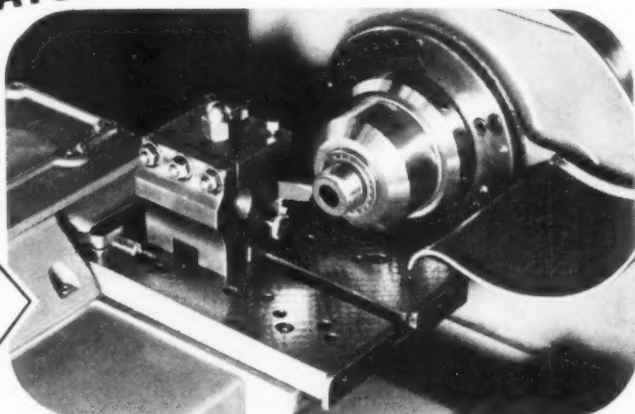
**Monarch**  
TURNING MACHINES

**THE MONARCH MACHINE TOOL CO. • SIDNEY, OHIO**



# THREADING THIN-WALLS IS A "NATURAL" for the CRI-DAN!

no DAMAGE  
no DISTORTION  
no DEFORMING



## THE CRI-DAN HIGH SPEED THREADING MACHINE

Write for  
Bulletin 75-MM  
Today!

is a natural for parts too thin-shelled for roll or die threading. Delicate shoulders are not shoved over . . . there's no distortion . . . no deforming . . . no resulting scrap! Interested? Write for Cri-Dan Bulletin 75 MM . . . it tells "The Advantages & Economies of Single Point Threading".

*The* **LEES-BRADNER** *Company*

CLEVELAND 11, OHIO, U.S.A.

# LOOK AT THIS PRESS

It's designed to provide industry with low-cost, high production units that are highly flexible in design and operation...relieving heavier presses of short runs and lighter work. Presses are practically fool-proof in operation. Frame is extremely rugged. Fingertip controls are conveniently located at hand level. Available for immediate delivery, in standard width (between uprights) of 24"-31"-36"-42" respectively. Available in special width up to 72" at small additional cost. Movable bed plates. Pumping unit has by-pass relief valve which can be set at any pressure up to press capacity. *All Standard* presses equipped with 2-speed built-in hand pumps for more sensitive and versatile operation.

## READ THESE "SPECS":

**CYLINDERS:** *Standard Models* furnished with 6" bore, 7½" stroke—spring return type; also 5" bore, 7½" stroke—spring return type. Above presses are *standard*. Following can be furnished at additional cost: Double Acting, 6" bore, 7" stroke; 6" bore, 11" stroke; 5" bore, 7" stroke; 5" bore, 11" stroke. Special long stroke cylinders also available, up to 48" in length, for incorporation in suitable press frames of our make. **PUMPING UNITS:** These units can be supplied in various volumes and pressures, in a total of 13 combinations.

## CHECK THESE USES:

There are so many everyday production uses for these versatile KRW Hydraulic Presses that we have lost count. Here are a few of the more obvious...blanking, forming, bending, broaching, straightening, stamping, embossing, numbering, upsetting, laminating, pressing and hot or cold forging.

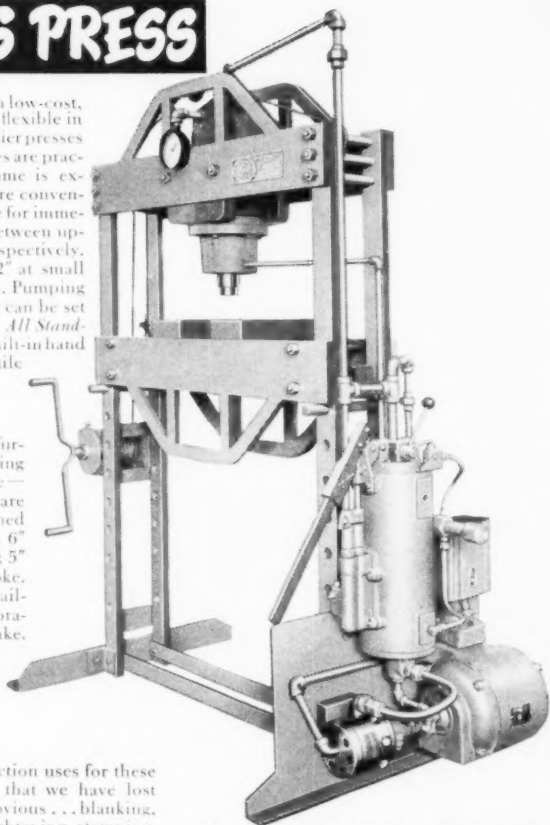
## BEAT THESE PRICES\*:

Depending upon capacity of pumping equipment, prices of Standard model motor driven hydraulic presses are as follows, F. O. B. Factory: 25-ton press from \$727.00 to \$992.00. 50-ton press from \$806.00 to \$1058.00. 60-ton press from \$1070.50 to \$1135.00. 75-ton press from \$1198.00 to \$1258.00. All motors in the above units are 220-440 volt, 3 phase, 60 cycle. Any change in motor specifications is extra.

\*Subject to change without notice.

# K·R·WILSON

215 MAIN ST. · BUFFALO 3, N. Y.



## MAIL THIS COUPON

K. R. WILSON, 13  
215 Main St., Buffalo 3, N. Y.

Please send me complete information on  
KRW Motor Driven Presses as follows:

- ☐ 25-ton ☐ 50-ton ☐ 60-ton  
☐ 75-ton presses ☐ Press Cap.  
☐ motor drive conversion unit

Serial No. \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City and Zone \_\_\_\_\_

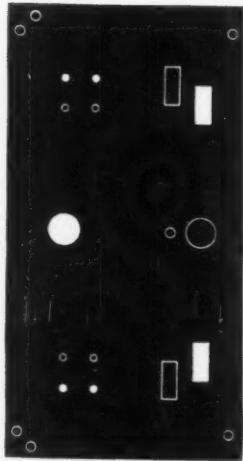
State \_\_\_\_\_



Setting up 3 Work Stops and 9 Wales Hole Punching Units for above operation required only 9.6 minutes. See combined set-up and running time for 50 pieces below.



Setting up 2 Pick-up Stops and 5 Wales Hole Punching Units for above operation required only 6 minutes.



# COMPARE WALES TIME STUDIES

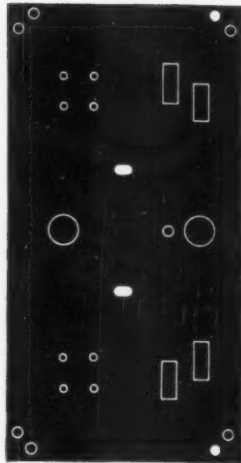
## WITH YOUR PRESENT METHODS

- If your present methods of hole punching do not produce similar parts including set-up time as fast as the total time of the typical part shown at the left you are letting dollars fly out your window.

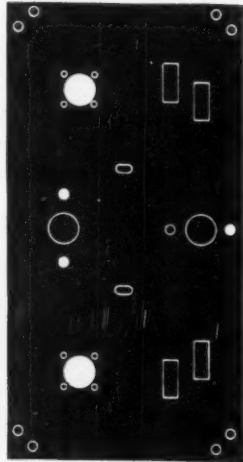
The patented design features of Wales Type "BI"



only 7.6 minutes.



Setting up 2 Pick-up Stops and 4 Wales Hole Punching Units for above operation required only 5.2 minutes.



Setting up 2 Pick-up Stops and 5 Wales Hole Punching Units for above operation required only 6 minutes.

PERFORMING TIME AVERAGES APPROXIMATELY .2 MINUTES PER OPERATION, THE TOTAL RUNNING TIME FOR 50 PIECES IS (.2 x 50 x 5 OPERATIONS) 50 MINUTES. THE COMBINED SETUP AND RUNNING TIME OF THE 50 PIECES IS 34.4 PLUS 50 OR A TOTAL OF 84.4 MINUTES.

not afford to overlook. For example, only 16 Wales Type "BL" Hole Punching Units were required to punch the 30 holes in the work shown at left.

Write for fully-illustrated Bulletin 7 TODAY and have all the cost-saving facts at your finger tips.

## WALES-STRIPPIT CORPORATION

GEORGE F. WALES, *Chairman*

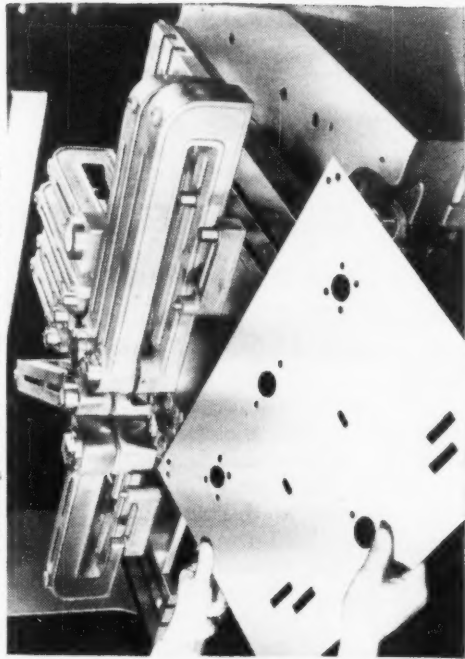
396 PAYNE AVENUE, NORTH TONAWANDA, N. Y.

*(Between Buffalo and Niagara Falls)*

WALES-STRIPPIT OF CANADA, LTD., HAMILTON, ONTARIO

### **Specialists in Punching and Notching Equipment**

Showing a typical set-up of a series of operations of Wales Hole Punching Units with finished work in foreground.



# *Western* — THE FAMOUS LINE

## **NEW — \* ANNOUNCING \* — NEW** **STEPTOE-WESTERN HIGH SPEED SHAPERS** **18 Ram Speeds — 200 Strokes Per Minute**

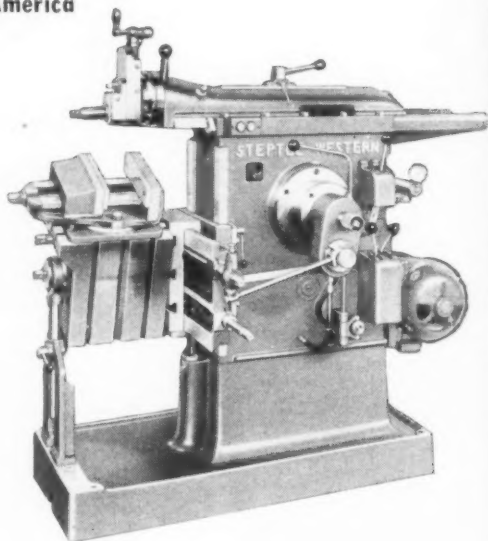
### **First 18 Speed, All-Geared Shaper in America**

Available in 12" and 15" sizes  
9 or 18 speeds, all-geared speed changes

Vee Ram—Adjustable Gib  
Helical Bull Gear and Pinion  
Timken Bearings throughout  
Filtered Pressure Lubrication  
3 H.P. Vee Belt Drive  
Eight Automatic Reversible Feeds

Universal or Plain Table  
Alloy Steel Sliding Gears  
Heavy 10" Swivel Vise  
Centralized Controls  
Micro Dials—Stroke Index  
Splined Shafts—Sliding Gears  
Outboard Table Support  
Highest Quality Construction —  
Low Cost

Write for catalog No. B5021



**ALSO IN 4 SPEED TYPES & HEAVY DUTY TYPES 14" TO 24" STROKES**

**— STEPTOE — ALWAYS "FIRST" IN SHAPERS —**

# **WESTERN MACHINE TOOL**

**COMPLETE LINE: RADIAL DRILLS • SHAPERS • AUTOMATIC**

**OF PRODUCTION EQUIPMENT**

THE 'BIG

**4**

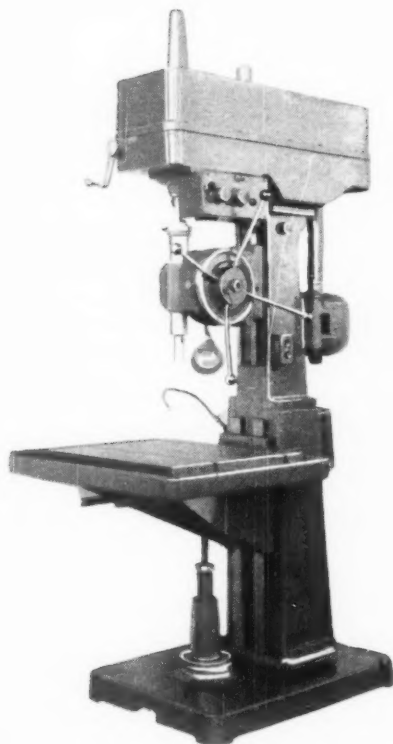
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**SINGLE OR MULTIPLE SPINDLES  
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24" Swing — 1" Drill in Cast Iron  
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**TAPPERS • UPRIGHT DRILLS • ENGINE LATHES**



**NEUTROL**  
Magnetic  
Chuck  
Controls

## WHEREVER MAGNETIC CHUCKS ARE USED



THE ELECTRO-MATIC RECTIFIER AND NEUTROL MAGNETIC CHUCK CONTROL ARE INDISPENSABLE FOR BETTER AND SAFER GRINDER PERFORMANCE

NEUTROL Magnetic Chuck Controls speedily release and demagnetize workpieces. With NEUTROL, there's no need to hammer or pry to release the work. This saves time and tempers—saves marred, distorted workpieces and prevents damaging of chuck faces. NEUTROL also protects chucks against harmful voltage surges.

ELECTRO-MATIC Rectifiers are sturdy, heavy duty, direct current supply units, engineered to "stand up" day-after-day in the hardest service. They are available in any desired voltage combination in capacities ranging from 50 to 20,000 watts.

NEUTROL and ELECTRO-MATIC Rectifiers can be installed easily on equipment already in use—or built into new machines before delivery if you so specify.

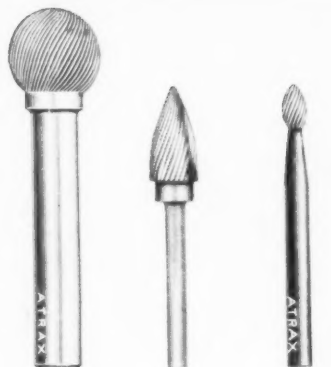
*Let us send bulletins giving full information—no obligation.*

**ELECTRO-MATIC PRODUCTS CO.**  
2235 North Knox Ave., Chicago 39, Illinois



**ELECTRO-MATIC**  
Industrial  
Rectifiers

## ATRAX CARBIDE BURS



Large burs  
on  $\frac{1}{4}$ " shanks

$\frac{1}{4}$ " burs on  
 $\frac{1}{8}$ " shanks

$\frac{1}{8}$ " solid  
carbide burs

The modern way to file and finish is with burs. They last longer than grinding wheels, remove stock faster, retain their shape longer; they replace time-consuming hand filing and do better work. ATRAX BURS offer all these benefits — and many more. Precision ground of tungsten carbide, they outlast ordinary burs more than 50 times without regrinding and effect savings up to 10 times on practically any material from plastics to hardened steel. Discover how much more you can get out of ATRAX CARBIDE BURS. Ask for Bulletin A-60 describing a complete range of sizes, shapes and cuts.

## ATRAX CARBIDE MILLS

Atrax features solid Carbide Mills  $\frac{1}{2}$ " and under. These mills are more rigid, spring of steel shank is eliminated and there is no loosening of brazed tips. Load is evenly distributed among the flutes. Write for Bulletin A-64.



## ATRAX CARBIDE REAMERS

These are solid carbide reamers with an odd number of flutes — hence there

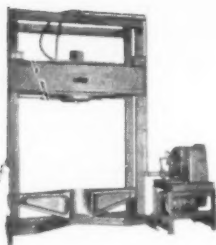
are no opposing crushing loads on the cutting edges. Radius relief chamfer and highly lapped lands for better finishing and longer life. Ground to a tolerance of .0002. Sizes from  $\frac{1}{16}$ " to 1" diameter;  $1\frac{1}{2}$ " to 8" length. Bulletin A-62 gives you all the facts. Request it today.



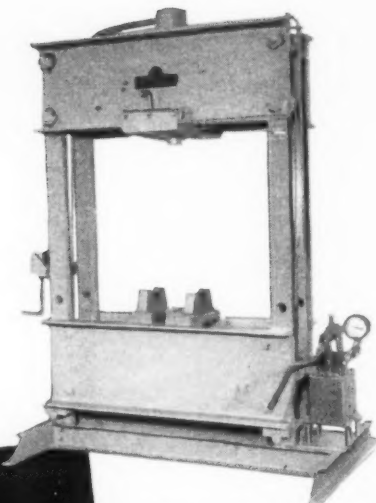
### THE ATRAX COMPANY

FRANCIS AVE. and DAY ST., NEWINGTON 11, CONN.





SPECIAL 150 Ton Open Yoke Vertical Press with adjustable head member and double-acting cylinder.



STANDARD 150 Ton Shop Press with new Rodgers 4-speed Hand Pump.

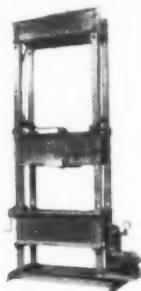
## Rodgers 150 AND 200 TON SHOP PRESSES

### Fast, Versatile Hydraulic Presses With Hand or Power-Driven Pumps

Here are versatile, time-saving presses you can use in a hundred ways—the Rodgers 150 and 200 Ton Hydraulic Shop Presses, operated with your choice of new 4-speed Hand Pump or Power Pump.

The standard 150 and 200 Ton Units include many construction and operating features, outlined in our new catalog. If specifications on the standard models don't meet your requirements, we'll modify them or build a special press as required.

There are standard model Rodgers Shop Presses in 60, 80, 100, 150, 200, 300 and 400 Ton Capacities!



SPECIAL 150 Ton Shop Press featuring a 96" opening with adjustable head and bolster.

#### SEND for CATALOG . . .

New Catalog 313 has descriptions and specifications on the complete line of shop presses.



# Rodgers Hydraulic, Inc.

7453 Walker St., St. Louis Park, Minneapolis 16, Minn.

**HYDRAULIC POWER EQUIPMENT**

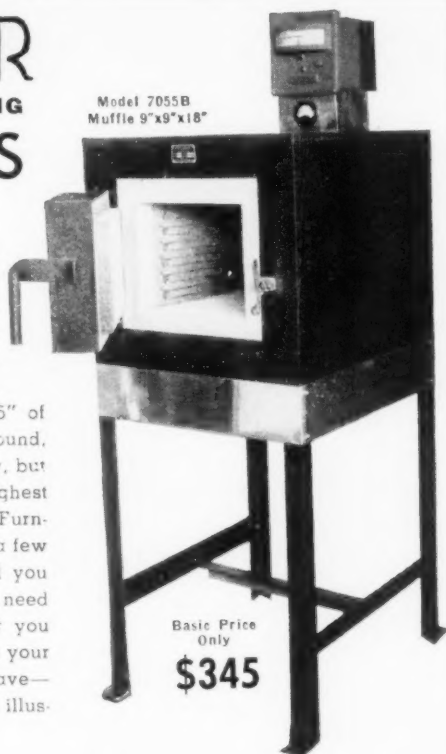


# LUCIFER

## ELECTRIC HEAT TREATING FURNACES

Lucifer introduces a completely new line of Electric Heat Treating Furnaces. The models No. 7055 are floor models — rigidly constructed of the finest materials obtainable and have a temperature range up to 2000°F. Look at the construction — at least 5" of insulating refractory all the way around, and not one or two types of refractory, but four different types are used for highest efficiency. That's why "LUCIFER" Furnaces are so cheap to operate — only a few cents an hour for most of them. And you only have to buy the equipment you need now — later you can add whatever you want without any premium or loss on your part. Think of the money you can save — and the convenience. Send for free illustrated literature.

Model 7055B  
Muffle 9"x9"x18"



Basic Price  
Only

**\$345**

MODEL	SIZE	BASIC PRICE	WITH ACCES. GROUP A	WITH ACCES. GROUP B	WITH ACCES. GROUP C	K.W.
7055A	6x6x12	\$195	add. \$39.60	add. \$98.60	add. \$172.50	4
7055B	9x9x18	\$345	" "	" "	" "	6.5
7055C	12x12x24	\$464	" "	" "	" "	17
7055D	18x18x36	\$945	" "	" "	" "	26
7051	6x6x6	\$155.25	Bench With Accessory (Group B)	FLOOR MODEL \$166.75	FLOOR MODEL \$339.25	2
7053	8x8x10	\$270.25	Bench With Accessory (Group B)	FLOOR MODEL \$281.75	FLOOR MODEL \$454.25	3.5
7052	12x12x12	\$385.25	Bench With Accessory (Group B)	FLOOR MODEL \$396.75	FLOOR MODEL \$570	6.5

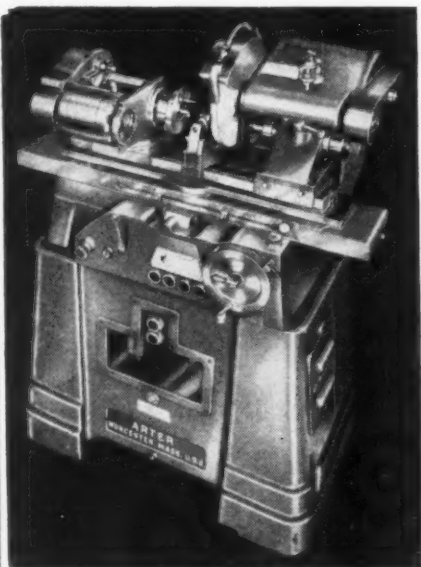
ACCESSORY GROUP A—Pyrometer & Thermocouple  
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ACCESSORY GROUP C—100% Electronic temperature control—ammeter and polished aluminum trim.

**SPECIAL SIZES AND TYPES MADE TO YOUR SPECIFICATIONS**

• ALSO AVAILABLE IN 2300°F MODELS •

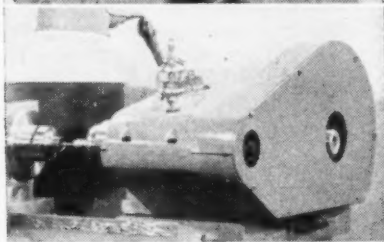
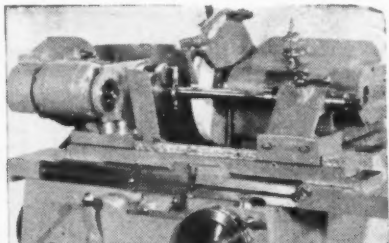
**GILBERT S. SIMONSKI** SOLE MANUFACTURERS  
401 N. BROAD ST. PHILADELPHIA 8, PENNA.

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## ARTER

MODEL No. 103



**A relatively low-priced machine for cylindrical, internal, end or surface grinding.**

The ARTER Model No. 103 grinder can be purchased as a combination machine for the classes of work illustrated, or it can be purchased just for cylindrical jobs, or for internal work. Many of these machines are being used for tool room work or as auxiliary capacity to take the overload of higher priced machines.

**ARTER**  
**GRINDING MACHINE CO.**  
 WORCESTER, MASSACHUSETTS • U. S. A.

# **\$100**

## **"DE-STA-CO"**

### **CLAMP INVESTMENT**

**saves  
over**

# **\$5000**

**each shift  
per year**

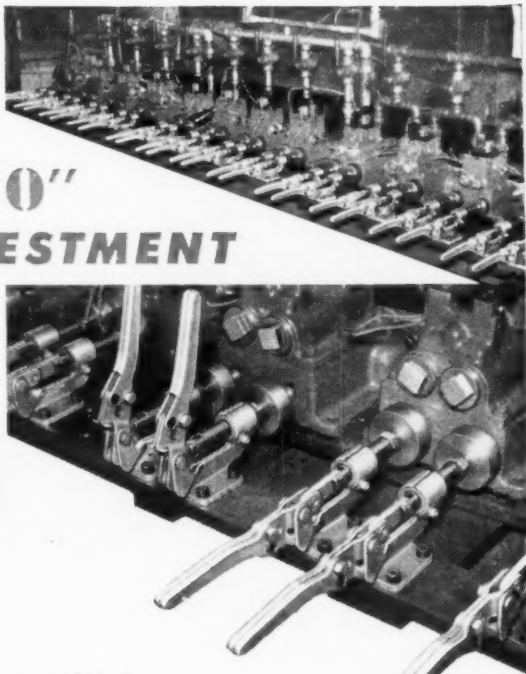
A saving of 12 man-hours per shift is reported by **Ross Operating Valve Company** with this fixture, built around 24 "De-Sta-Co" Model #620 Toggle Clamps.

The fixture holds **Ross** 4-Way air operating valves during a "run-in" operation. The clamp plungers are tipped with rubber grommets which seal exhaust and intake ports during the "run-in," after which the valves are torn down and inspected carefully. Besides the actual saving in man-hours, these "De-Sta-Co" Toggle Clamps convert a tedious setup job into one quickly and accurately performed by less highly-skilled labor.

For your problem in production work-holding there's a "De-Sta-Co" Toggle Clamp that assures increased efficiency, accuracy and savings. Whether you're machining, welding, gluing, bonding, inspecting or assembling, you do it faster . . . and cheaper . . . with "De-Sta-Co" Toggle Clamps. Our catalog describes more than 40 fixture and portable models, holding capacities over 2500 lbs. Write for your copy today, and name of nearest "De-Sta-Co" distributor.

**DETROIT  
STAMPING  
COMPANY**

**347 MIDLAND AVENUE  
DETROIT 3, MICHIGAN**



*Photos courtesy  
Ross Operating Valve Co.  
Detroit, Mich.*

**INCREASES  
PRODUCTION...**

**LOWERS COSTS...**

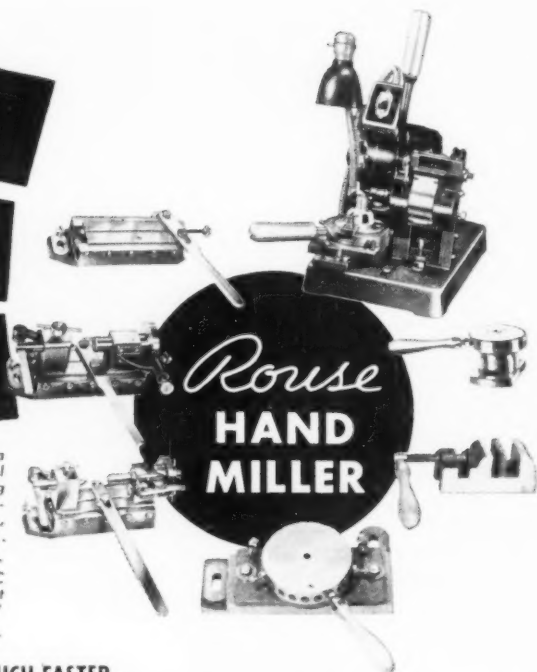
**PAYS FOR ITSELF  
QUICKLY...**

The ROUSE HAND MILLER is a widely used, inexpensive, high speed, ball bearing, motor driven machine for handling light cuts in brass, aluminum, steel, plastics, and other materials—fast, accurately, and at very low cost. Only \$98.00\*.

Fixtures (illustrated) extra.

Motor equipment:— $\frac{1}{4}$  H.P. 110 Volt AC 60 cycle, single phase, swivel motor mount and light—\$25.00\*

\*All prices FOB Chicago.



- ★ **MILLS SMALL PARTS MUCH FASTER.**
- ★ **DRASTICALLY CUTS YOUR INVESTMENT IN EQUIPMENT.** Replaces expensive production machinery—or releases it for other jobs.
- ★ **INEXPERIENCED HELP CAN OPERATE IT.** Safe, simple, fool-proof operation.
- ★ **NO MORE COSTLY SET-UP TIME.** \$98.00\* price so low that it pays to keep one or more Hand Millers always set-up for special operations.
- ★ **YOU GET A BETTER PRODUCT**—the result of ABSOLUTE ACCURACY.
- ★ **A LOSS BECOMES A PROFIT** when marginal pieces are finished on the Hand Miller instead of on high cost equipment.
- ★ **VERY LOW MAINTENANCE.**
- ★ **USED REGULARLY IN 1163 MANUFACTURING PLANTS** (some of which use as many as 30 machines)—yet on the market a scant few years.
- ★ **UNIQUE—VERSATILE.** Nothing else like it. One or several machines can be the answer to some of your production problems.

Write today  
for further  
information.

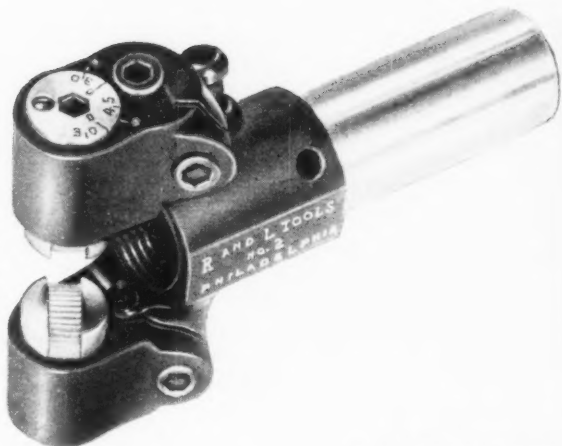
**H. B. ROUSE & COMPANY**

2214 N. WAYNE AVE., CHICAGO 14  
50 YEARS OF SERVICE TO INDUSTRY

# R AND L TOOLS

## NEW! R and L KNURLING TOOL

New streamlined design has half the weight of existing tools of comparable size, affords better grip and controls of knurls. Available in a complete range of sizes. Only one Hex Wrench needed for all adjustments.



## R and L FLOATING DRILL HOLDERS

For Holding Drills —  
Reamer or other tools  
No. 00— $\frac{5}{8}$ " dia. shank  
No. 1— $\frac{3}{4}$ " dia. shank  
No. 2—1" dia. shank


LARGER SIZES MADE  
TO ORDER

WRITE FOR CATALOG

# R AND L TOOLS

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# Get EASIER, FASTER, METAL MARKING



With one easy operation of the Pannier Supreme Holder, you can stamp a series of neat, legible figures or letters in hot or cold metal—save time and labor as compared with stamping just one character at a time.

This hand-style hammer is machined from high grade tool steel with no rivets or welded joints. Hardened anvil base in type slot holds 1/16" to 1/2" steel type in consistently perfect alignment. Tool steel striking head will not mushroom or spall—can be easily removed and replaced when worn, thus greatly increasing life of holder.

Supreme Holders are available in many styles, types and sizes to meet your needs. Write for details.

## with the *Pannier* Supreme STAMP HOLDER

Pannier, specialist in design, engineering and manufacture of *all* types of marking equipment, also offers Steel and Rubber Stamps, Type, Dies; Stencils; Embossing Equipment; Marking Inks; and Special Marking Machines for any marking need. Write for recommendations.

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Chicago, Ill., Los Angeles, Calif.,  
Youngstown, Ohio, Philadelphia, Pa.

Jacksonville, Fla.



## THE PANNIER CORPORATION

203 PANNIER BUILDING

Pittsburgh 12, Pa.



## featured in this issue

**How's Business.** A current review of business conditions as they prevailed at press time. Charts illustrate machine tool shipments, the total industrial production index, comparison being drawn between 1950 and 1949, and the total American steel production. Page .... 65

**Materials Handling, Close Control, Results in High Output,** by Fred M. Burt. Standardized, efficient mechanical handling of plant goods, plus close control over methods have resulted in greatly increased production for the United States Bumper & Spring Co. Page ..... 71

**The General Shops of the Southern Pacific Railroad** by Gerald E. Stedman. This article, by the BLUE BOOK'S field editor describes the latest machine tool equipment, the skilled craftsmen and the ingenious tooling which make these shops so outstanding, as well as notable for their excellent labor relations. The efficiency per man hour is unusually high. Page ..... 77

**Light Machine Tools in Today's Industrial Plant,** by F. A. Corothers. This article takes up the use of light drill presses and similar light machine tools, their uses and applications in modern industrial plants. Page ..... 85

**Production Economies with Compressed Air** discusses some of the operations where the ingenious use of this medium has considerably increased production in a California plant. Several standard air compressor practices are described in detail. Page ..... 95

**What You Can Do About the Equipment Crisis,** by L. W. Scott Alter. The president of The American Tool Works Co. has some timely and telling information to offer on the current American industrial facilities; the present trend indicates the serious decline of plant facilities. The author's suggestions on evaluating present equipment are worthy of consideration. Page ..... 105

**Herman Reichardt's Quizzes.** Pages .. 106-123

**Views from Here and There.** Page ..... 115

**News of the Industry.** Page ..... 121

**Special Report on Knee Type Milling Machines.** This is the third of the special monthly reports prepared by the editors of the MACHINE and TOOL BLUE BOOK on modern machine tools. This month's report deals with the use of carbides in milling, a description of late model knee-type milling machines, with series and major specifications of American-built machines. Page ..... 133

**Letter from Great Britain,** by Clifford T. Bower, of Machine Shop Magazine, London, writing this month in place of Mr. Robert Hutcheson, editor of this leading British metalworking publication. The letter is a review of the current business scene in the United Kingdom. Page ..... 157

**Modern Tools in Action.** Page ..... 163

**Shop Hints.** Page ..... 171

**Foremanship Forum,** by Ed Mottershead. Part 2 of the current discussion on Public Speaking for Foremen appears in this issue. "Let Your Actions Talk" takes up the value of gestures as well as words in influencing audiences; the author's ideas on the subject should be of use to foremen and others. Page .... 177

**Available Literature.** Page ..... 190

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**Appointments and Promotions.** Page .... 202

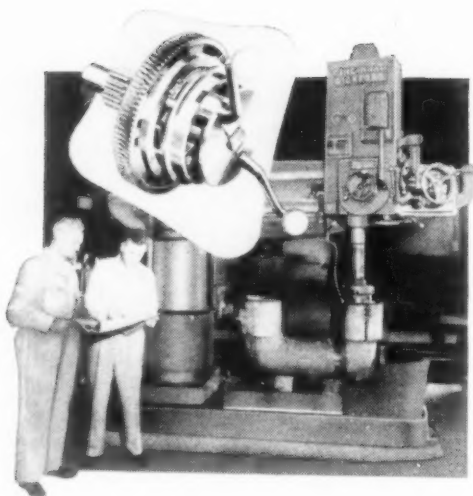
**What's New in Metalworking.** Page .... 207

**Market Place.** Page ..... 271

**Mechanics Through the Ages.** Page .... 272

**Product Index.** Page .. ..... 274

**Index to Advertisers.** Page ..... 282



At the Wheland Company, Chattanooga, Tennessee, this 6' arm 19" diameter column SUPER SERVICE Radial is boring 11 1/8" diameter holes out to a finished size of 11 3/4" diameter in cast steel pump parts, holding an accuracy of plus or minus .001.

# 11 3/4" in CAST STEEL

Heavy work is being performed with absolute safety on Cincinnati Bickford SUPER SERVICE drilling machines, with extreme ease of operation. Unlike any other, the SUPER SERVICE clutch is a sturdy positive tooth type. It has a large diameter hardened steel ring, with saw tooth serrations on the inner circumference, into which two opposed serrated hardened steel segments are snapped instantly by touching either one of the twin quick return levers. This requires only finger tip effort.

The feed is driven by the spindle through a safety feed gear. This is a patented exclusive feature of the SUPER SERVICE Radial and guarantees protection of this mechanism for the life of the machine, against damage due to over-load.

Write for further information about our complete line of Upright and Radial metal drilling machines.

*Equal Efficiency of Every Unit  
Makes the Balanced Machine*

**THE CINCINNATI BICKFORD TOOL CO.** Cincinnati 9, Ohio U.S.A.



## *as the editor sees it*

### **Significant Clause in G.M. - U.A.W. Contract**

American business has had strikes and the threats of strikes hanging over its head so many years that it has become as much of an occupational itch as a hazard. The recent signing of the five-year contract between G.M. and the Reuther men might promise, therefore, to be an influence in reducing the perennial itch for large segments of industry.

Roughly, the contract, recently concluded, calls for a 4 cents yearly wage increase over and above the cost-of-living adjustment. Instead of the \$125 pensions demanded by the unions, workers over 65 with 25 years of service will receive \$100 a month, including social security.

There is one significant factor in this contract which is of prime importance to the metalworking industry. It concerns the 4 cents an hour yearly increase.

This 4 cents an hour is called an "annual improvement factor". The

unions realize that G.M. will install new equipment to increase production and to realize savings in manufacturing; this 4 cents per hour is the amount each worker will receive as his share of such savings. The clause is revolutionary. It means that Reuther's union realizes that machines and labor can live side by side and that labor, by heartily cooperating in the efficient use of such machinery, will profit. Due credit should go to Reuther.

By the same token let us congratulate G.M. for making it possible for labor to share in the savings which modern machinery provides. We have often felt that few labor leaders would speak out against the installing of new machinery if some method were established whereby they would participate in any savings resulting from the use of modern equipment. Other companies would do well to study G.M.'s approach and devise their own method of permitting labor to share in the profits of labor-saving devices.

There would be less talk of "machines take jobs", and more talk of "machines make money".

*William F. Schleicher*

# **E**nthusiastic Customers do our BEST advertising

Standard Pressed Steel Co., Jenkintown, Pa., use No. 25 Grand Rapids Hydraulic Feed Surface Grinders in making the tools and dies that produce Unbrako Socket Screw Products, Flexloc Self-Locking Nuts and Hallowell Shop Equipment.



**You** will appreciate the micro-inch finish produced at production speeds on Grand Rapids Grinders. All Grand Rapids Hydraulic Feed Surface Grinders have these outstanding features:

1. One-piece column and base casting for vibrationless rigidity
2. Precision ball-bearing spindle which is greased for life
3. Bijur one-shot lubrication system eliminating hand oiling
4. Patented vertical movement of wheel head for quick, accurate adjustments
5. Portable coolant tank for ease of coolant replacement
6. Vane type hydraulic pump for fast longitudinal table travel

*to serve you—*

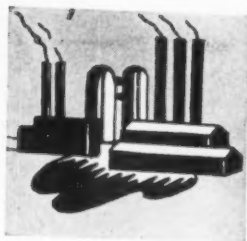
Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Drill Grinders, Tap Grinders, and Combination Tap and Drill Grinders.



**GALLMEYER &  
LIVINGSTON**  
COMPANY

**GRAND RAPIDS GRINDERS**

405 Straight, S. W., Grand Rapids 4, Mich.



MTBB  
JULY, 1950

## How's Business?

### Prices Heading Upward

As spirited as business is the upward climb of prices. Heavy steel scrap, quoted at \$32 a ton less than two months ago is now around \$46. Observers say if the demand continues scrap can easily reach \$50 a ton. This would then be twice as much as a year ago.

Copper, which stands at 14½ cents a pound is up 4¾ cents over March.

The price of natural rubber is up considerably. It now stands at 33 cents a pound as compared to 16¼ cents a pound a year ago.

business is on the move again. It is expected that the Federal Reserve Board Index will set new highs.

Steelmakers are still operating at peak capacity. In the last week of May, and overlapping into the first few days in June, steelmaking furnaces operated at 101.5 per cent of capacity.

The automobile boys are not behind in the

### Employment

May employment figure stood at 59,731,000 and represents a gain of 1,063,000 over April. Unemployment dropped in May to 3,057,000 and is a decrease of 458,000 from April.

### Expansion

A new factory for the Tinnerman Products, Inc. is planned to be erected in Cleveland. Cost will be about \$1,500,000 and contain 133,000 square feet of floor space.

A \$500,000 plant is being planned for Ekco Products Co. of Chicago. The plant, 60,000 square feet, will be built in Whittier, Cal.

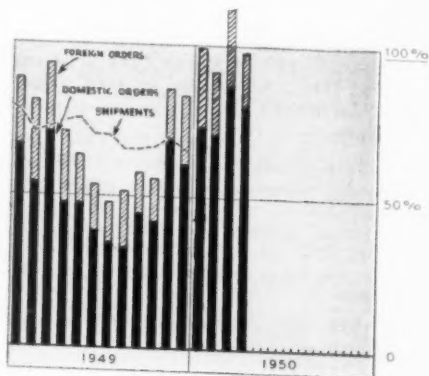
Reco Tanks, Inc. a subsidiary of Richmond Eng. Co., Richmond, is building a new \$100,000 factory at Greensboro, N.C.

Michigan Abrasive Co. has increased facilities almost 75% by buying the Detroit factory of Michigan Tool Co., who moved to Traverse City two months ago.

### Production

After a slight breather over Memorial Day

**MACHINE TOOL SHIPMENT CHART**  
A quantity comparison between 1949 and 1950



source: National Machine Tool Builders' Association

## TOTAL INDUSTRIAL PRODUCTION INDEX

A comparison between 1949 and 1950

source: Dept. of Commerce  
base: 1935-1939=100

\* \* \*

production parade. During the week ending on June 3rd they assembled 147,914 passenger cars and trucks. During the month of May automobile production of passenger cars reached an alltime record of 581,317 units. This is an increase of 21,000 units over the record established in August 1949. It is anticipated that June will be an even bigger production month.

### Building

Not to be outdone by either the automobile and steelmaking industries is the construction industry which is busy setting its own records. In May more than \$1.9 billion worth of new construction was finished. This exceeds the peaks reached in the fall of 1948 and 1949.

In 1949 total private construction totaled \$4,955 millions of dollars; in April 1950 this rose to \$6,026 millions. Total public construction was \$1,723 millions in 1949 and rose to \$2,048 millions in April.

The screw machine industry is looking for-

ward to coming within 3% of last year's third quarter. During the earlier part of the years their business was down 10% over a corresponding period last year.

### Canadian Trade Fair

Held in Toronto recently, the Canadian Trade Fair showed a preponderance of British equipment in the machinery, engineering, and plant equipment classifications.

British industry occupied almost three quarters of the floor space in the Automotive Building which housed industrial equipment and machinery. These are indications that the British are quite seriously going after the American machine tool trade. Alfred Herbert, Ltd. has ambitious plans for trading in the U.S. Its line of equipment costs approximately one-half of that of American machines.

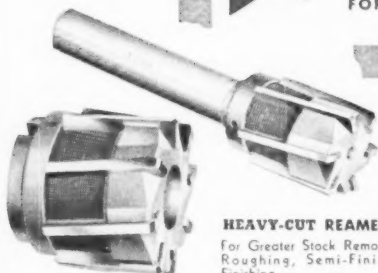
### Truck Rates Overhauled

Should proposed revisions in motor truck steel haulage rates go into effect as a result of some 400 trucking companies having filed new tariffs with the I.C.C., it will cost shippers



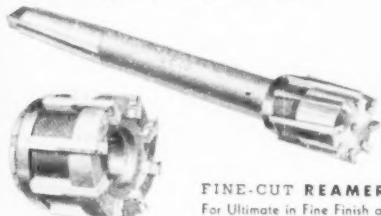
# Specify **BARBER-COLMAN** **PIN and WEDGE** **REAMER DESIGN**

FOR BETTER SIZE AND FINISH CONTROL



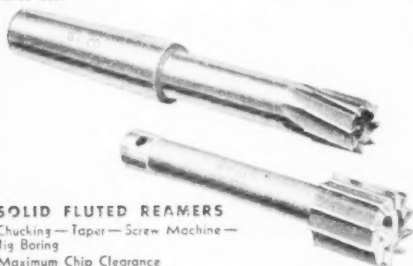
**HEAVY-CUT REAMERS**  
For Greater Stock Removal  
Roughing, Semi-Finish,  
Finishing

Pin and Wedge Mounting Equivalent to Solid Flute Construction  
Also Right Hand Spiral Blades Available for Heavy Stock Removal  
Increased Chip Clearance, Stronger Tooth Backing



**FINE-CUT REAMERS**  
For Ultimate in Fine Finish and  
Close Limits of Accuracy

Pin and Wedge Mounting Permit Greater Number of Blades  
for Improved Finish  
Blade Adjustment Gives Long Life with Minimum Maintenance Cost



**SOLID FLUTED REAMERS**  
Chucking—Taper—Screw Machine—  
Jig Boring  
Maximum Chip Clearance  
Extremely Close Limits of Accuracy



25 YEARS ACCEPTED USE PROVES  
SUPERIOR JOB PERFORMANCE

- \* IRREGULAR BLADE SPACING FOR IMPROVED FINISH
- \* MORE BLADES PER REAMER DIAMETER
- \* STURDY, NON-SHIFT BLADE MOUNTING
- \* EASY ADJUSTMENT, QUICK SET-UP
- \* LONGER SERVICE THROUGH IMPROVED SHARPENING
- \* NO THREADS OR BEARINGS TO RECONDITION

*All Styles in HSS, CAST ALLOY or CARBIDE TIPPED.*

Twenty-five years of practical reaming experience cost nothing when you buy Barber-Colman Reamers. Yet this background provides the ultimate in production reaming design, fewer inspection rejects and lowest reaming cost. Check your reaming operations and consult with Barber-Colman Reaming Engineers. Their reaming experience will prove results with maximum job performance. A complete stock selection is available to meet your specific requirements.

**METHODS ENGINEERS!**

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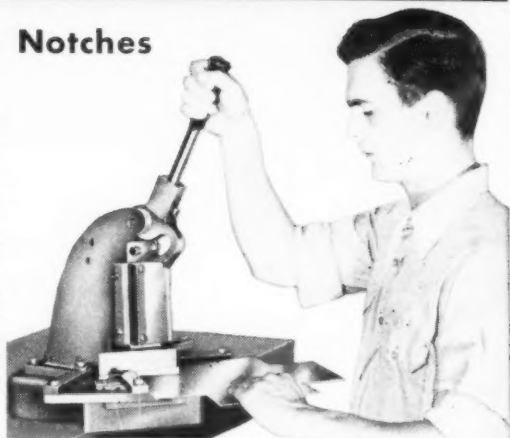
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# THE **di-acro** NOTCHER

## Duplicates Precision Notches WITHOUT DIES!

The new precision DI-ACRO Notcher is so fast and easy to operate that it is no longer necessary to invest in dies and set up a punch press for many production notching operations. It can be so quickly adjusted for any size or shape notch within its capacity that it is also ideal for experimental or research work. Many straight shearing operations are also possible with this unit.



### CUTS CLEAN—NO BURRS OR ROUGH EDGES

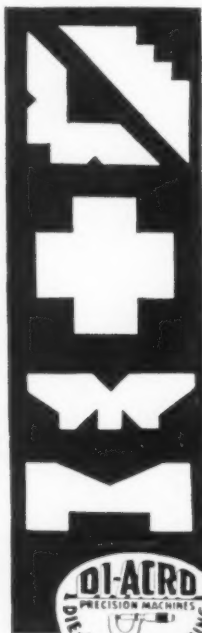
The powerful action of the DI-ACRO Notcher results from an exclusive DI-ACRO designed roller bearing cam which provides a tremendous pressure with a small amount of effort. The precision-ground Vee-shaped ram and blades of alloy tool steel assure clean cuts and permanent accuracy in production runs of duplicated notches.

**LARGE CAPACITY.** The DI-ACRO Notcher will cut 90 degree notches up to 6 by 6 inches in 16 gauge steel in one operation. Larger notches, and wider or narrower angles, can also be cut. A built-in flexible gauging device quickly locates a notch in the desired position and duplicates it exactly.

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**ENGINEERS — DESIGNERS — PRODUCTION**  
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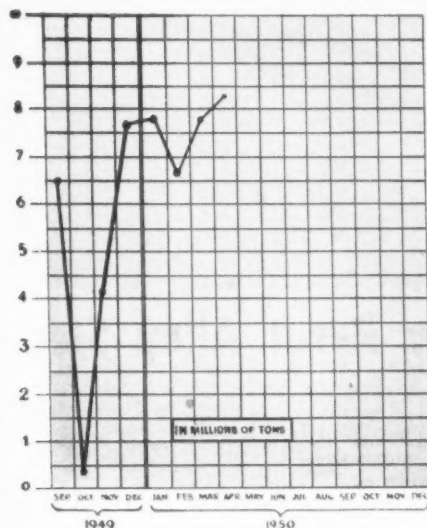


## O'NEIL-IRWIN mfg. co.

314 EIGHTH AVENUE, LAKE CITY, MINNESOTA

## TOTAL STEEL PRODUCTION CHART

A quantity comparison between 1949 and 1950



source: Am. Iron and Steel Institute

more for hauling steel after June 21. There will be two minimums for truckload shipments instead of the heretofore 20,000-lb. minimum rate now in effect. The 20,000-lb. minimum will remain, but a 32,000-lb. minimum will be added to freight schedules.

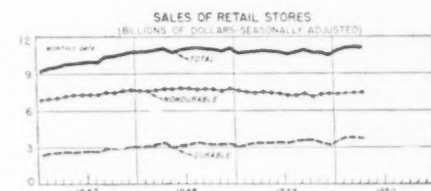
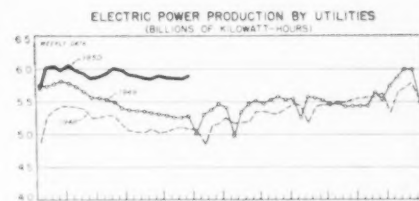
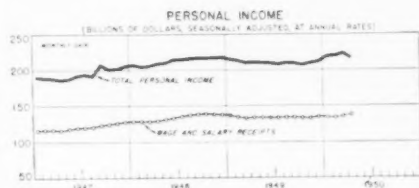
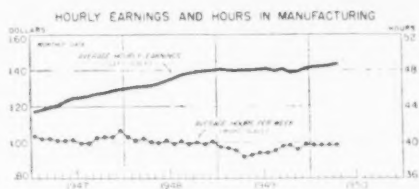
On 20,000-lb. loads, the rates are scheduled to be upped from 10 to 20%. Loads of 32,000-lbs. or more will go into effect on the above date unless protests are filed with I.C.C. None have been registered up to recently, nor are any expected.

## Credit Outlook Not Encouraging

According to the Federal Reserve Board, the American public is going head over heels into debt with no let-up in sight. In April outstanding consumer credit stood at \$18,629 million. This is an increase of \$3,034 above April 1949, and \$4,570 above April 1948.

One of the major spurts in credit buying has come through the purchase of automobiles.

## GENERAL BUSINESS INDICATORS



source: Dept. of Commerce

A warning comes from Dr. Edwin G. Nourse, formerly chairman of the Council of Economic Advisers. He warned the National Association of Purchasing Agents, meeting in Cleveland, that the nation may be in the first stages of a serious price inflation. This inflation might lead to a collapse. He blames particularly the liberal credits which are being extended to home and other durable goods buyers.



## New Rycut Alloy Steel Cuts M\* Costs 40%

\*M stands for all machining and related costs including actual machining time, down-time necessary to re-grind tools and finishing time.

### Here's how:

1. Rycut, a medium carbon alloy, machines 25% to 50% faster than standard alloys of the same type, in either the annealed or heat treated condition.
2. Rycut generally increases tool life 100% — in some cases, as much as 300%.
3. Rycut requires less grinding after hardening due to its better machined surface finish.

These savings have been proved by the shop experience of Rycut users throughout the country as well as by carefully recorded machinability tests. Yet the initial cost of Rycut is practically the same as that of standard medium carbon alloys.

You need no special shop techniques with Rycut. It requires only conventional oil-quench and temper methods of heat

treatment; also responds well to flame or induction hardening. And remember, a Ryerson Certificate of analysis and hardenability accompanies every shipment of annealed Rycut to guide its heat treatment.

This money-saving steel is available for immediate delivery — annealed or heat treated — in rounds, flats or squares, in a wide range of sizes. Just call your nearest Ryerson plant for test samples or an initial order. Write for technical bulletin explaining the advantages of Rycut.

### Additional Saving —

Another important saving may be gained by concentrating a variety of steel requirements in a single order to your nearby Ryerson plant. Lower prices in the higher quantity brackets and economies in time and paper work add up to a substantial saving.

Carbon, Alloy and Stainless Steels in Most Every Size, Shape and Finish — In Stock, Immediate Shipment.

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||  
**materials handling,  
close control,  
results in**

## **HIGH OUTPUT**

---

**by Fred M. Burt**

Maximum mechanical handling, close control and an efficient standards and methods set-up, pay off in greater productivity for this west coast manufacturer of automobile coil suspension springs. The United States Bumper & Spring Co., relies heavily on the use of new equipment.

**T**HE UNITED STATES Spring & Bumper Co., Los Angeles, Cal., had to use every means to cut costs while maintaining top quality of product, through selecting, engineering, and installing the most up-to-date equipment, followed by closely controlled, efficient operation. The "ways and means" employed to achieve this goal is the subject of this article.

The entire operation of the \$250,000 installation is confined to a space 32' wide (including a service aisle on one side) by 260' long. It is close to one section of the large raw stock steel storage yard. From here, pre-cut lengths of round bar stock of special alloy spring steel are delivered to the first operation at the north end, over a system of Cleveland tramrail, bridge cranes and hoists, by a 5-ton hoist. Each bundle delivered contains about 400 rods, weighing approximately 6000 pounds. The bundles are placed on feeding tables close to two No. 3 Cincinnati Centerless Grinders. Much of the time one man feeds both machines. The rods vary in length from eleven to

twelve feet and from .690 to .725 inches in diameter, figure 1.

Each rod travels through the grinding operation automatically, and is then ejected onto a rack on which it rolls to the side, past a Productometer which registers the count, and into a 4" wide channel. On the bottom of the channel there is a 3" Link-Belt conveyor which carries to a gravity side roll-off arrangement, where the rods are picked up by a finger-roll conveyor, figure 2.

This unit carries the evenly-spaced rods over to the roll-squeeze operation. As they move slowly along, the end of each rod is heated in a gas-fired batch furnace to a length of 10" to 12", for tapering.

The operator inserts the hot end between two rolls which widens and narrows it. The next operation is a squeeze in an automatic squeeze-die; then another roll, a second squeeze and a final roll. In the third squeeze the rod is inserted deeper into the squeeze-die to receive a part number imprint.

After this operation, another Link-



Fig. 1. Feeding spring steel rods into one of the two No. 3 Cincinnati Centerless Grinders.

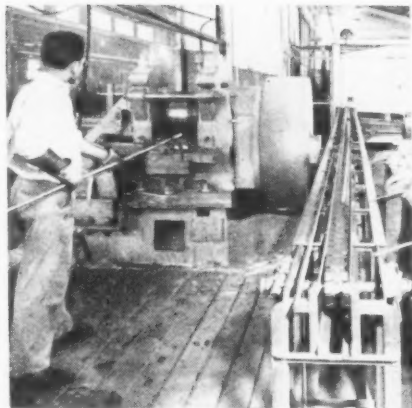
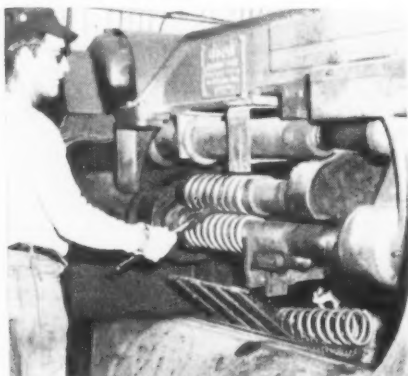


Fig. 2. Conveyor is feeding centerless ground rods to roll-squeeze operation with farther ends of rods being heated.

Belt conveyor carries the rods to another roll-off on the storage table. They are then fed from this table into a large walking-beam, gas-fired heating furnace, on one side, with a full-load capacity of 110 bars. The "walk" across to the other side of the furnace consumes eighteen minutes. The rods are then deposited on powered-rolls which eject them into the tongs of the coiling machine operator, figure 3. The roll-squeeze operation shapes the rod end so that it will give it a "start"

Fig. 3. Forming coil springs on Gogan Coil-forming machine.



when inserted into the clamp of the Gogan coil-forming machine. This foot pedal controlled, compressed-air operated clamp holds the rod until it starts coiling sideways along the mandrel, guided by the screw die above. This die is set to make the proper number of revolutions for the number of coils required. The mandrel then retracts to the right by automatic compressed-air actuation, with a stop holding the coil until it is stripped off the mandrel, after which it drops onto a steel mesh basket. The mandrel then returns to former position, and the clamp opens for the next rod.

The coiler's helper uses tongs to place the formed springs on a transverse, horizontal shaft with 3" x 2½" paddles 90° apart around the circumference, figure 4. As this revolves, it places the springs in two rows in a feeding drum with a capacity of two springs long and four springs around. This feeds the two rows of springs onto a series of paddle shafts that extend the length of the 12' long reheating furnace. On each side, (with a capacity of 26 springs) the successive shafts have three and two paddles alternately for each spring row, thus allowing the paddles to mesh as they turn, and to keep the springs revolving.



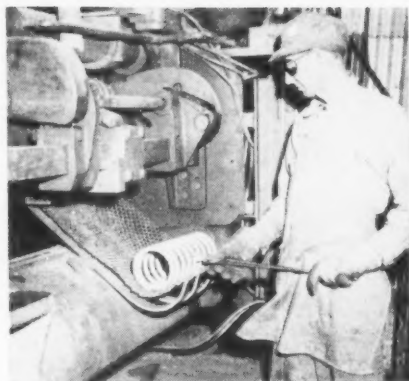


Fig. 4..Coiler's helper "tonging" formed springs to re-heating furnace.



Fig. 5. Transfer of formed springs from re-heating furnace to oil-quenching unit.

At the furnace end, figure 5, the next operator tongs them into a revolving quenching machine with eight compartments, which carries them down into an oil quench, then up for removal with tongs and placement on the steel slat conveyor of a draw furnace. A foot control actuates the revolutions of the machine. The oil is constantly circulated for cooling purposes.

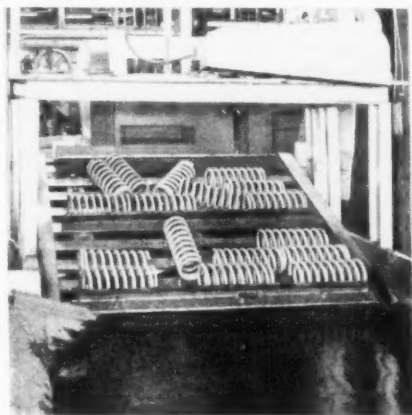
This draw furnace, 32' long, 63" wide, carries three rows of springs. For greater capacity they can be double-tiered with the upper springs placed lengthways. At the end of the draw furnace the springs drop into a constantly-circulating, cold water quench tank, figure 6. From this tank the springs are carried up and out on an escalator-conveyor for placement in the adjacent American Wheelabrator cabinet.

With rolls on each side keeping the springs revolving, they are carried slowly forward on a rubber belt under the impact of steel shot, thrown with great centrifugal force from two Wheelabrator wheels. The quantity of shot cast at the springs is determined by an electrol control checked by an amperage dial registering up to 25 amperes. The setting is kept at 11 amps. The shot-peening provides a type of surface forging that adds to the strength and life of the springs.

From shot-peening, the springs are

carried on top of a link chain conveyor to a Gogan Load Bull-dozor, figure 7, and Load Testing machine. This machine has two dials, one to regulate compression height, and one to register the load applied to the spring. First the spring is bull-dozed down to its solid height. After release, the compression height is set for the load test. The dial registers the number of pounds of compression required

Fig. 6. Springs drop into cooling water and are carried out on an escalator-conveyor to be placed in the shot peening Wheelabrator in the background.



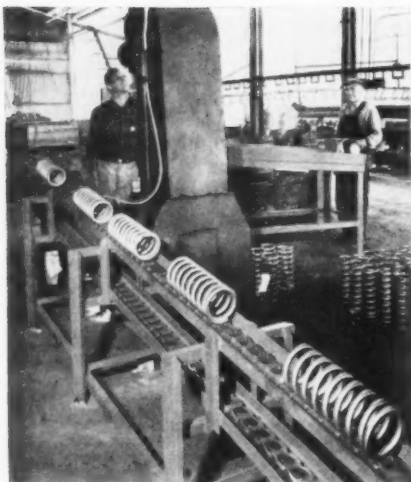


Fig. 7. From shot peening springs are conveyed to load testing machine.

at a given height. The springs are separated as to load, in steel channels, in which they are fed to an operator on a 12" x 1½" grinding wheel who score marks each spring with a single mark under a given load, with two marks for those above. From there on the springs are kept separate, even to packing on different pallets. The springs are also given Brinell hardness tests at different times during the day.

The last manufacturing operation is the black enamel dipping, followed by three passes through a 20' long baking oven. With four springs to a hanger, and hangers two feet apart, the 224' Richards-Wilcox zig-zag conveyor fully loaded, has a capacity of 448 springs. After being pulled through the dipping tank, the springs are carried up over a drain pan to the elevated oven. As they descend, they are picked off and packed on three flats on pallets holding 162 springs, and held in position by steel straps.

An analysis of the operations shows up a smooth flow from beginning to end, with a maximum of mechanical handling under close control, and a surprisingly small number of man-



Fig. 8. Spring in Gogan Spring Tester with a large dial indicating 2420 lb. compression and small dial indicating compression height.

hours of labor in relation to production value.

Operations in this department and all through the plant, are kept at top efficiency through a complete Standards and Methods set-up, and an extremely successful incentive system that includes supervisory personnel. Daily, weekly, monthly, and longer period reports and summaries acquaint President, John B. Rauen, and General Manager, Ray Rauen, with every pertinent fact concerning production and costs, and their comparisons with standards set up and with past performances. THE END.

**J. Donald Rollins** has been promoted to assistant chief engineer of Carnegie-Illinois Steel Corp., it has been announced by this U. S. Steel subsidiary. **Norman C. Michels** has been appointed planning engineer to succeed Rollins, and **Harry C. Hunter** has been named contract engineer.

The Frederick Post Company, Chicago manufacturers of engineering supplies and equipment, recently appointed **Thomas L. Coatney** as general sales manager in charge of all sales operations.

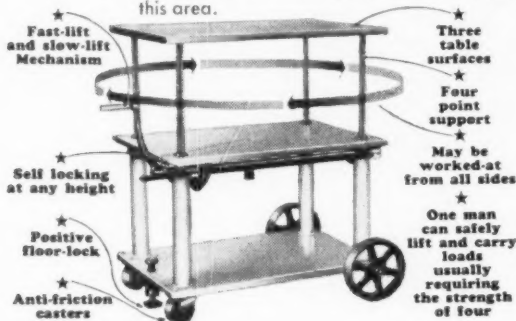
# Cut the costs

## THAT COLLECT

## TWO FEET ABOVE THE FLOOR



Watch, for a while, the heavy loads that are moved, elevated, and lowered in the horizontal space between 24" and 42" above the floor. Watch the stock feeding operations, the placement and removal of dies and fixtures, the assemblies and repairs which take place daily within this area.



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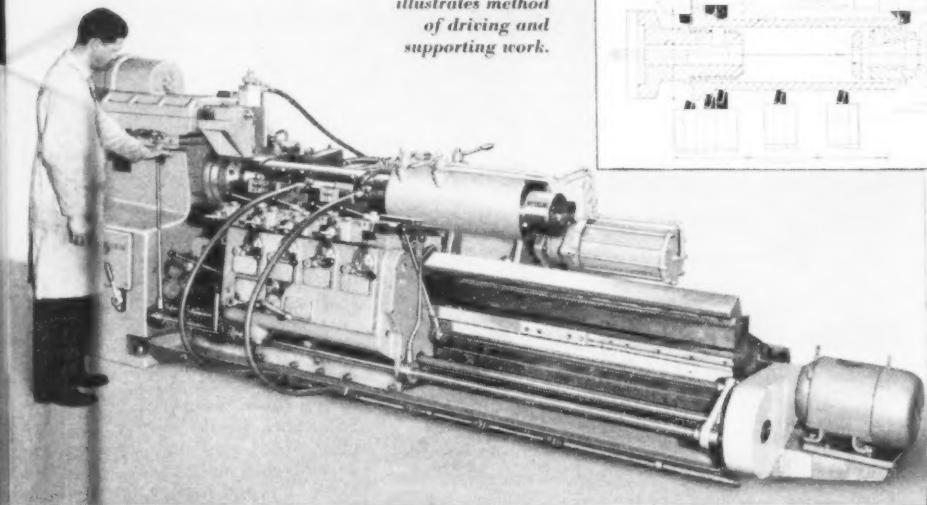
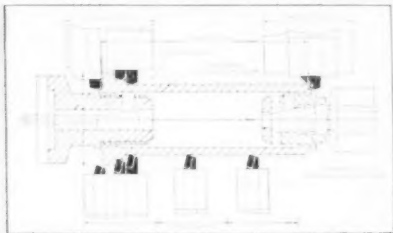
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# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

*Tooling Layout  
illustrates method  
of driving and  
supporting work.*



## NEW Lo-swingy LATHE MACHINES LARGE PUMP LINERS OF VARIOUS SIZES

**Problem:** To turn, square and chamfer large pump liner forgings, varying in size from 4" dia. x 10" long into 12" dia. x 30" long, on a single machine with a change of tools and drivers only.

**Solution:** The new Model "LS" Lo-swing Semi-Automatic Lathe was chosen for this job because of ease of change-over for various sizes, and its ability to transmit 100 H. P. to the cutting tools. Work comes to the machine with the bore rough forged. O. D. must be turned concentric with the rough bore. The piece is held at the headstock end by a 3-jaw, air-operated, expanding arbor, while the tailstock end is supported by a 3-jaw, expanding plug center, the jaws of which

expand when the tailstock quill moves forward. Turning is accomplished with 5 tools mounted on the 3 front carriage slides. Shoulders are squared and chamfered with 5 tools mounted on 2 back-squaring attachments. The New Model "LS" Lo-swing is designed to take full advantage of modern sintered carbide tools having tremendous capacity at high cutting speeds and coarse feeds, coupled with an ability to transmit up to 100 H. P. Other features include unlimited carriage travel, power feed to individually-controlled carriage cross slides, rapid traverse on all carriage and back attachment movements, etc. Write for Bulletin LS-50 describing this new lathe for heavy, multiple-tool turning.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH Lo-swingy

## THE GENERAL SHOPS OF THE

# *Southern Pacific Railroad*

*by Gerald E. Stedman*

THE GENERAL SHOPS of the Southern Pacific Railroad Lines at El Paso, Texas are responsible for repair and maintenance of the Motive Power of this great transcontinental system, from Yuma, Arizona, eastward. The work force here totals 1200, largely Latin-American under the general shop management of W. G. Reid, Supt. of Motive Power, has developed some of the best labor relations to be found anywhere in America. In fact, labor conditions there are so remarkably good that grievances are practically unheard of. Reid mingles with workers regularly on the job, is rightfully proud of the advanced skills of his men, provides them with the most modern tools and equipment, has given careful attention to building happy work surroundings. The man-hour efficiency is therefore, unusually high. The time-loss safety record is actually less than 1/1,000,000 man hours. The supervisory ratio is 1 - 48.

Oscar Gutsch, Shop Superintendent has educated foremen to dispose of grievances at source. I have not been in a shop where longevity of employment has been as great. Many of its machinists have worked there over 30 years. The average employment has passed 18.7 years. Intimately acquainted for so long, there has grown up a remarkable family spirit throughout the shop, and the management-labor concord here sets a fine example of what amicable work relations can be.

There has been a very considerable influx of Latin-



*Latest machine tool equipment, skilled craftsmen, and clever tooling make this shop outstanding. It is noted for its excellent labor relations. Man/hour efficiency is unusually high. A gay use is made of color throughout the SP shops.*

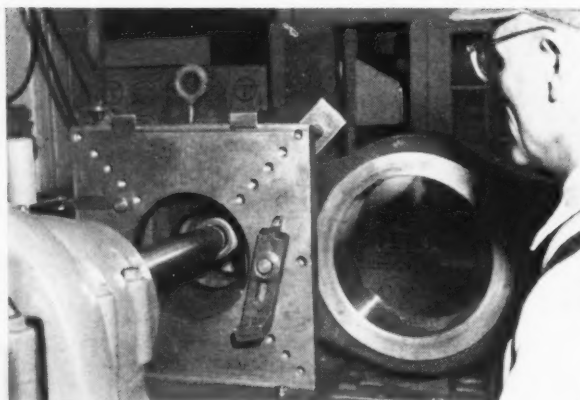


Fig. 1. Grinding  $6\frac{7}{8}$ " I.D. knuckle pin holes in a locomotive connecting rod using shop-made gage and taper attachments ( $1\frac{1}{2}$ " taper in 12"). Machine is a Heald internal grinder using Carborundum tooling. A mirror attachment enables operator to see far side of the work.

Americans throughout the Southwest along the Mexican border. The talents of many of these people are not as appreciated in other parts of the United States as they could be. They are outstanding in their ability to manipulate fingers and hands. I have watched Latin-Americans in the pecan factories around San Antonio move their hands so swiftly that it is difficult for the eye to follow individual movement. In recent tests at textile machines in the Southwest, Latin-Americans were trained into expert manipulation in one-third the time usually required, and regularly performed at a man-hour efficiency 170 per cent greater than norm. They make exceptionally skilled machinists and fine tool makers. Further, their artistry and inventiveness tends to cause enthusiasm for ingenious tool improvement in their job operations, so that at the Southern Pacific-El Paso General Shops, many of the machine tools are equipped with the jig and fixture designs of the machinist operators, which is one of the great reasons for the unusual man-hour efficiency attained.

A railroad shop the size of Southern Pacific at El Paso is a wonderland of machining, perhaps nowhere else can such a variety of special, difficult and precise work be found. Nor is much of the shop work merely that of repair, since maintenance really requires considerable production. Here, everything

concerning the complexity of parts involved in motive power up to the giant 4200 Class articulated consolidation (mallet) type locomotive, 6000 hp original SP design, requires extensive machining skill unknown in line production plants. The tooling requirements are therefore, unusually varied, making use of special design, peculiar methods and ingenious fixturing.

The main tool room of the SP-El Paso Shops occupies a well-lighted, well ventilated area of 25,000 sq. ft. within which 28 skilled toolmakers and three apprentices (grinder, lathe, shaper) work; the equipment being 7 grinders, 2 millers, 3 engine lathes, 1 tap lathe, 1 crank shaper, 1 boring mill, 1 turret lathe. This equipment is generally of late design, grinders being equipped with dust collecting units and most equipment accommodated by swing cranes. The distinctive thing in tool room appearance is its gay, colorful atmosphere. It was Reid's idea to "take away the usual graveyard effect" of greyness common to so many tool rooms by painting all machine tool components in lively color. The brightness adds much to pleasant working conditions, causes excellent care to be taken of tools, and has added definitely to safety.

Tool room floors are of rich brown with white and grey aisle stripes. Machine tool bases are brown, guards are yellow, upper structures are green, motors are buff. Industrial engineers in-



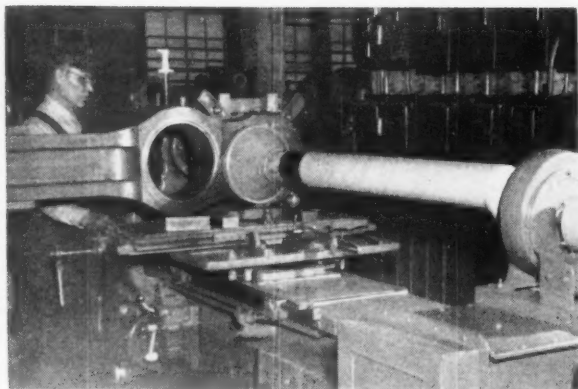


Fig. 2. Rear view of the grinding operation described in figure 1. A Pangborn dust collector is seen in the foreground. The connecting rod rests on a stand that can be adjusted to various sizes of connecting rods.

terested in conclusive evidence of the effect of color on working conditions, safety and efficiency, can find abundant proof here.

The tool room is under the general foremanship of E. F. Peters, who received his tool apprenticeship training here in 1928. Most of El Paso Shops tool makers are Latin-Americans. All are exceptionally skilled. All have high seniority ratings. There is an individual and collective inventiveness among them that is truly exceptional.

L. T. Lopez is a specialist on the Heald No. 50 internal grinder. Many attachments, jigs and fixtures are of his own design. I observed him grinding knuckle pin holes in a large connecting rod, using taper attachment to

effect  $1\frac{1}{2}$ " in 12", a  $6\frac{7}{8}$ " i.d. being involved, with an interesting set-up using shop-made gages to accommodate varied sizes of cylinders and rods, a steady-rest stand adjustable to a variety of heights, the Heald operation being reflected in a mirror to permit Lopez to see the far side of the grind, figures 1 and 2. This Heald receives such tool grinding as cylinders for pneumatic motors, feed water pumps, steam gear reversing heads. It is equipped with the latest Pangborn dust collecting apparatus and is accommodated by swing crane.

The Shops have a battery of Brown & Sharpe grinders of late design, in charge of E. W. Cain, figure 3. His group grinds reamers, mills, taps,

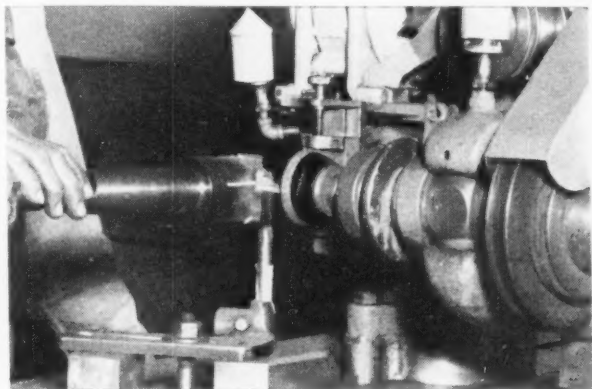
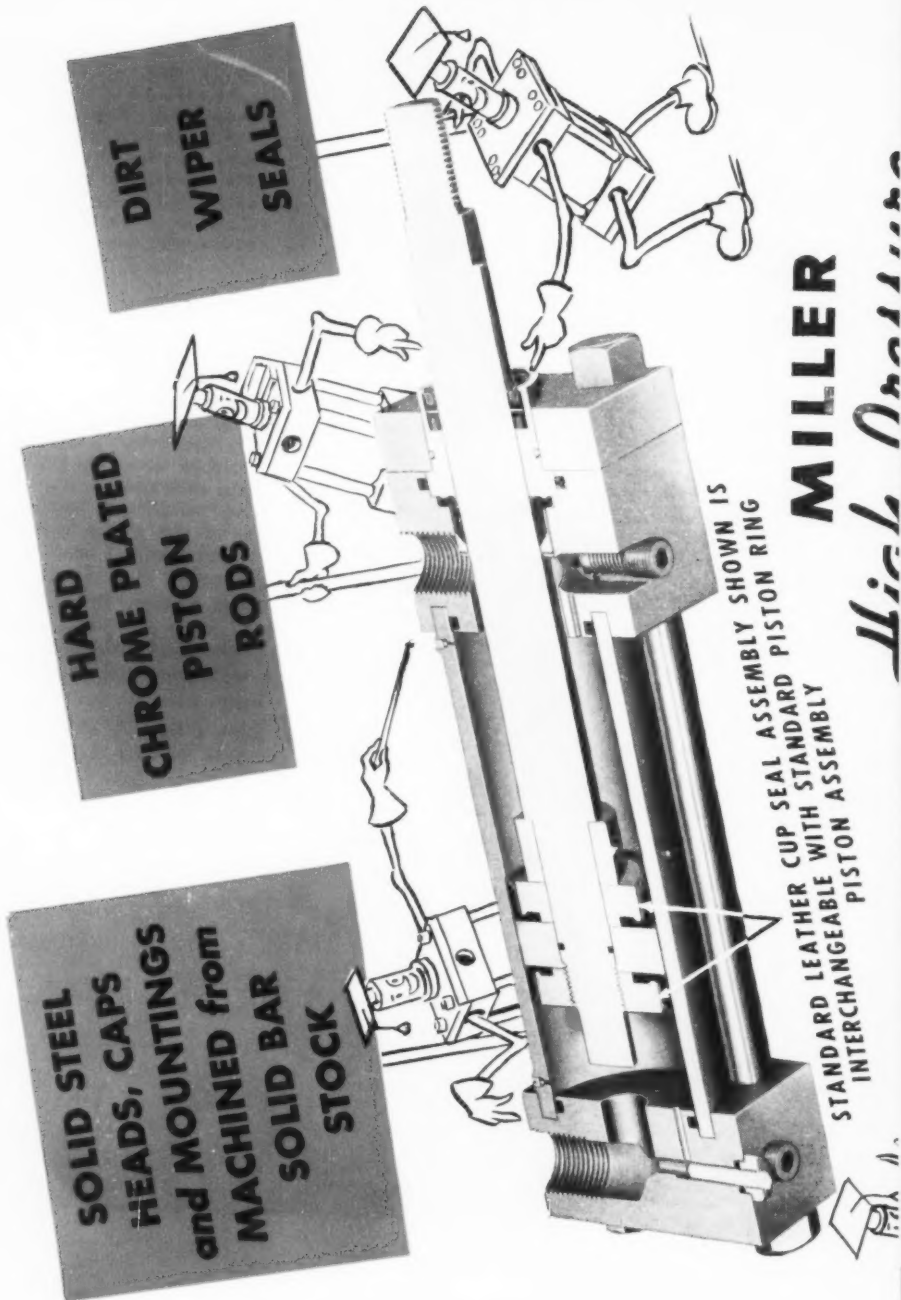


Fig. 3. Setting up a Brown & Sharpe grinder with a diamond wheel to grind the carbide tips of an end mill.





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Write for illustrated cylinder bulletins A-105 and H-104

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ST. LOUIS AND OTHER AREAS.

broaching tools in great variety. Because of the very great amount of special work, the shop makes many of its own end mills and gang cutters—many of these using carbide tip inserts which are extensively used in machining operations. Much use is also made of negative rake. I noticed cutter tips on boring mill, turret and engine lathe operations, product of shop making that have lasted more than a week without sharpening.

J. M. Perez, is expert in cutter de-

sign and tool making. I watched him cutting a 115-tooth worm gear for a slab miller with 18 $\frac{1}{2}$ " O.D., a very tricky cutting job. I noticed a flue sheet cutter of Perez' design, used on a twin spindle drill capable of being set to a variety of sizes from 2" to 5-19/32" which drills and countersinks in one operation. This was from high speed tool steel. Many of the cutters are spiral and herringbone type with as many of 20 cutting blades.

Ben Loustaunau's talent has developed many special adapter jigs that can be adjusted to any position in back-off. I noticed an adapted made for the face plate of the lathe dog to adjust the tap for backing off. This provided a great improvement because previously it was necessary to always change the gear train. Wrapper sheet taps for firebox or boiler, wash out plug taps, Huron plug bushing taps and other special taps, both right and left hand thread are regularly accomplished by the Shops, and are his specialty. I was particularly interested in a reamer-holding adapter to ream seats, using left hand thread for facing seats on gage cocks, boiler check and blow-off valves.

Very often the collective tool designing and brains of this fine group of old-time tool makers gets together on special designs of unique utility. For example, I watched the operation of a main and side rod polisher of shop design and making. This used a 36-grit abrasive, endless 1/32" belt in 4" or 6" widths. This polisher rides on a track so that belt travel can be worked fore and aft, using roller work holders to maintain table position, is manually operated. Pressure is controlled by counter-balanced arm carrying the abrasive belt movement. The power is 3 hp. electric motor, the stand is welded construction, polishing is Pangborn dust collector equipped. The endless belt is of carborundum 36-grit, manufactured specially for the Shops by Behr-Manning. This side rod polisher has attracted the attention of railroad shop men the country over. (Photos by Margaret Stedman) THE END.

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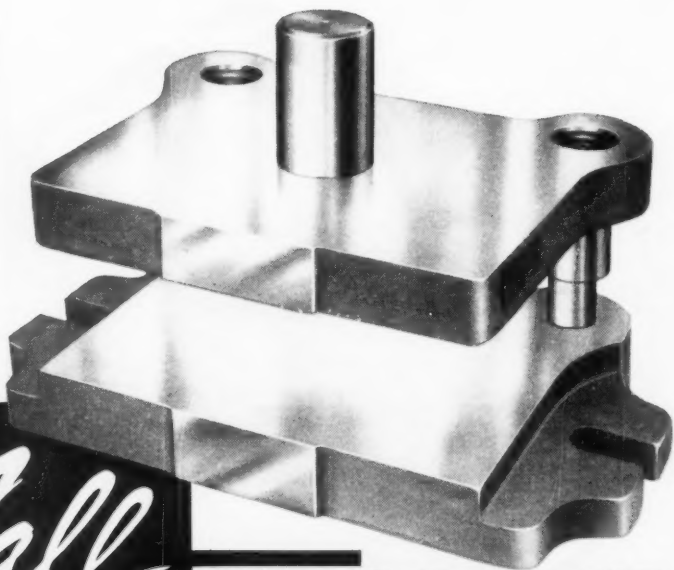
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# Light Machine Tools

in Today's

## INDUSTRIAL PLANT

by F. A. Corothers

The acceptance, by industry, of light drill presses, as well as other light machine tools, is comparatively recent. This article is primarily concerned with the use of light drill presses, their uses, and applications.

**P**RIOR TO 1940 light machine tools found little acceptance in the larger industrial plants. Up until that time all machines in industry were of the heavy duty type, and most manufacturers were increasing the size and weight of the new models they were introducing.

Industry believed that in order to do a real job and produce efficiently and with the required amount of accuracy, light machine tools just would not fit into the picture. It was generally accepted that light machine tools would not stand up under the pounding of production line work, that they lacked the accuracy of the larger tools, that they were so limited in their capacity that they would be useless from a production standpoint, and that their construction with sealed, lubricated-for-life ball bearings was not the type of construction that would serve well and long in the production-line type of manufacturing.

It was not until World War II that management began to consider the advisability and the merit of using some of these lighter machine tools, whose virtues the light machine tool manufacturer had been shouting about for the past number of years. They began to replace some of their larger tools with light machine tools, and it wasn't long before hundreds of Delta tools and other makes of light machine tools were in the plants of various manufacturers all over the country.



where they were used in many different and varied operations. They were used for maintenance and repair work, on the production line, in inspection departments, as special purpose machines, in shipping departments, for experimental and research work, and as supplemental tools to the production tools already used.

Typical of how many manufacturers utilized the light machine tools is the Albert Specialty Company of Chicago, Illinois. This company manufactures a complete line of low and medium priced photographic accessories.

In June, 1942, when production on photographic equipment was frozen, they were confronted with the problem

of converting to war production. They obtained some sub-contracts on aircraft parts and signal corps equipment, and Mr. Timm, production manager, stated that if they had not been able to obtain machines within two weeks after they were ordered, they would not have been able to handle their sub-contracts. He was particularly proud of the three-spindle special setup they had designed for drilling, counter-sinking, and tapping six holes at each end of a large tube used in making signal corps tripods. They could not obtain a three-spindle machine at the time, so they moved a single-spindle model alongside a two-spindle unit. Mr. Kenneth Moore, their engineer, designed a

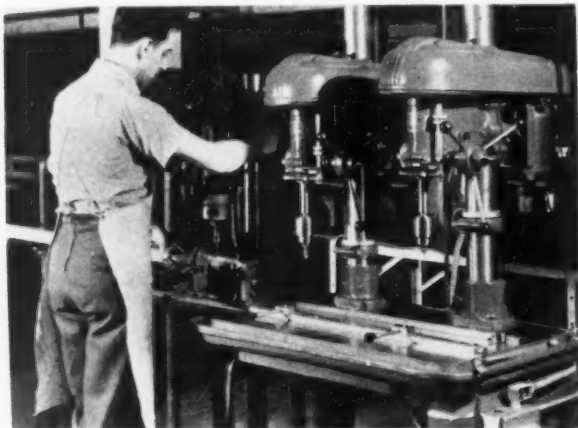


Fig. 2. Special drilling and indexing fixture which permits the drilling of holes within .02 inch.

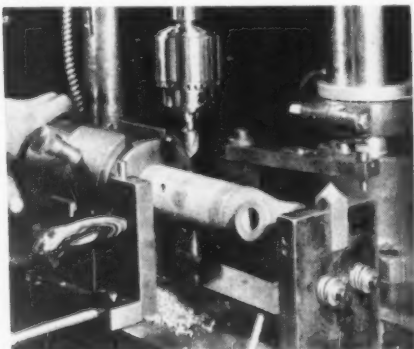
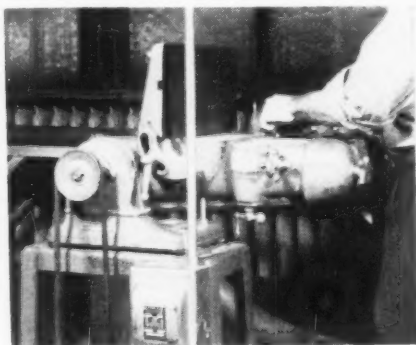


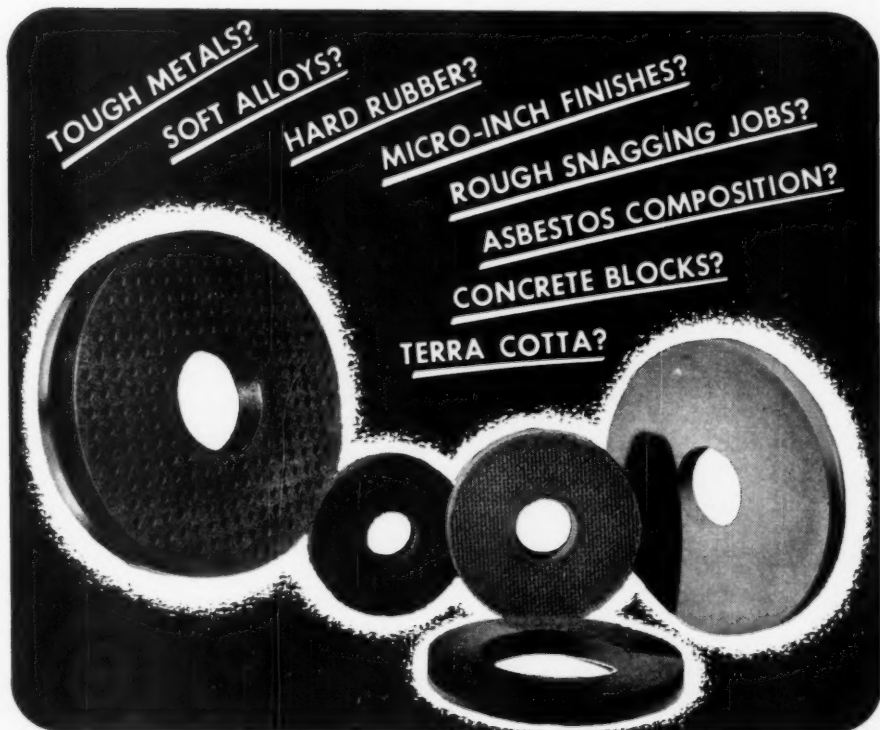
Fig. 1. A single-spindle unit moved alongside a two-spindle unit used for drilling, countersinking, and tapping six holes.

Fig. 3. An abrasive belt machine knocks fins off small castings.





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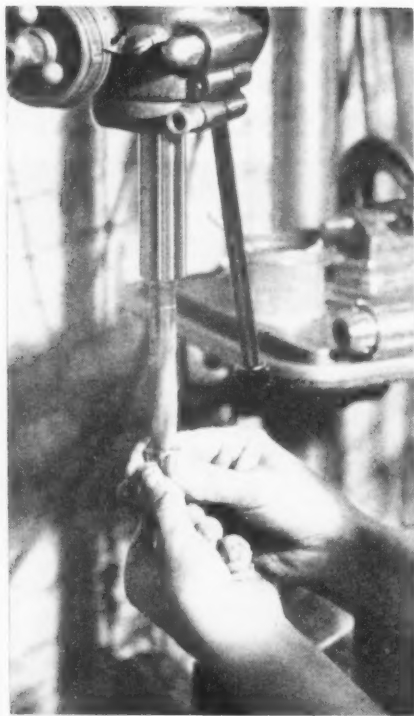


Fig. 4. Operator cleaning out oil cups.

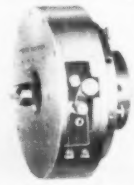
special drilling and indexing fixture that enabled them to drill the phenolic tubing and brass casting simultaneously within position limits of .02", thus making the tripods interchangeable. In addition, there was an actual 50% saving in time and a 100% increase in produc-

tion over the older methods used. No. 20 drills and 10/32" taps were used with a Proconier tapping head, figures 1, 2, 3.

An abrasive finishing machine was used to knock fins off small castings, and here the portability and versatility of the machine enabled them to take on war work that they would not have been able to handle otherwise.

Still another problem that management faced at this time of ever-expanding production was that of training inexperienced personnel. Before these new employees could be efficiently used on production jobs, they had to know something about the machines they were to run, and here posed quite a problem. The large heavier industrial type machines were quite complicated in operation. Many of them were very heavy and hard to operate, and above all, they were very imposing and frightening to anyone unfamiliar with machinery or not mechanical minded. Here, undoubtedly, is where the light machine tools showed up to a very decided advantage. They were small in size, and trainees were not frightened by them, and consequently felt confident and learned to operate them easily. They were light, easy to handle, and less fatiguing than the heavier type of machines, and therefore could easily, efficiently be operated by women workers.

The Precision Gear Company, a producer of special and standard gears, found 14" and 17" drill presses the answer to continued production with women operators, and used them exclusively for drilling, for special work,



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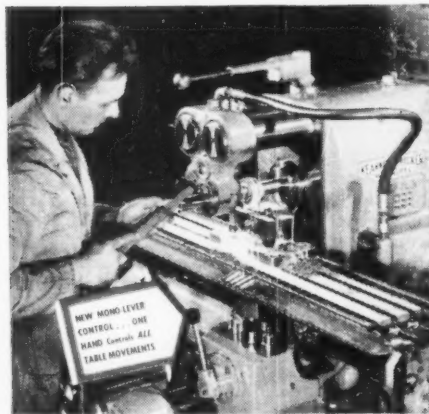
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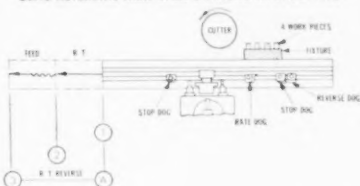
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3. Reverse dog returns table in rapid traverse to starting point (A) where stop dog ends cycle.
4. Fixture is unloaded, reloaded, and cycle is repeated.

Diagram shows how machine mills four workpieces at a time without constant operator attention. Automatic cycle eliminates need for hand "inching" operation to cut. Operator easily inspects and burrs finished pieces while machine is running.

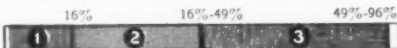
### COMPARE

Production by old method.



Production gain using a Kearney & Trecker Milling Machine with Mono-Lever Control and Automatic Table Cycle.

#### HERE'S GRAPHIC PROOF OF SAVINGS RESULTS



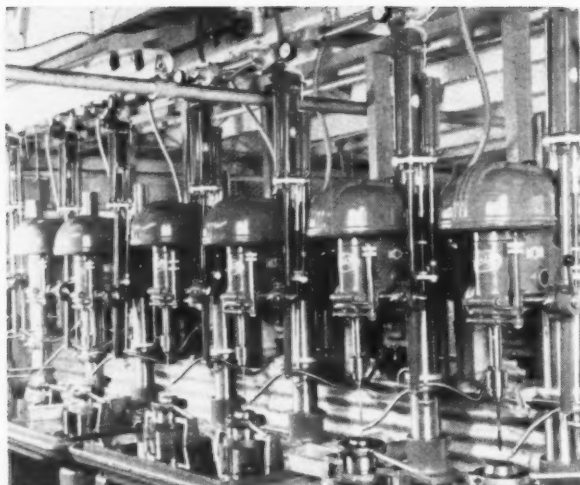
- 1 The minimum over-all savings reported from any job when done on a Kearney & Trecker Milling Machine with Mono-Lever Control and Automatic Table Cycle.
- 2 The majority of over-all savings from jobs done on these machines fall here.
- 3 Under favorable conditions, several jobs done on these machines have shown savings like this!

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 Fig. 5. These drill presses, operating in batteries of two, use air cylinder feed with hydro-checked cylinders. Operation is to ream bushings for airplanes. The limit of error permitted is .0002 inch.  
 • • •

and for making tools for work in the special gear department. One 17" drill press has now been in operation constantly for six years without time lost due to breakdowns.

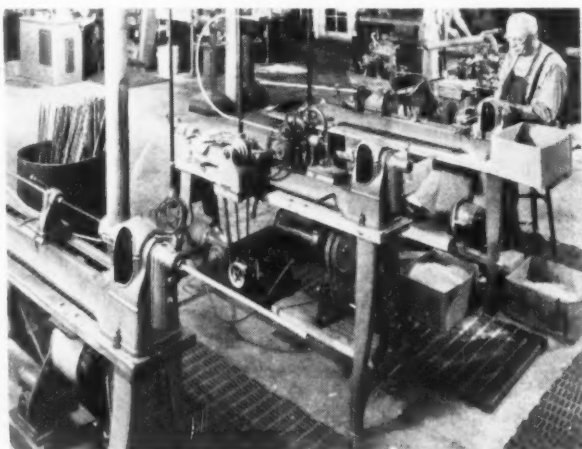
The ease and the safety of operation of these drill presses has permitted the use of women operators, and the cleaning operation in figure 4 is typical. In this photo an oil cup is being cleaned out with a large drill, and the work is hand-held.

Another example of how these light machine tools are utilized by women

operators is that of the eight 17" drill presses operating in batteries of two, which are used by an airplane parts manufacturing company in Los Angeles, and which is shown in figure 5. These drill presses using an air cylinder feed with hydro-checked cylinders as a control are used on an operation for reaming bushings for airplanes, and the limit of error permitted is .0002". One woman operator looks after all of these drills.

Management was convinced during the war years that these light tools

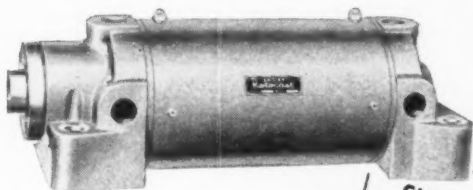
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 Fig. 6. Strips of bakelite are fed through the lathe headstock and come out a round piece such as a dowel rod would be.  
 • • •



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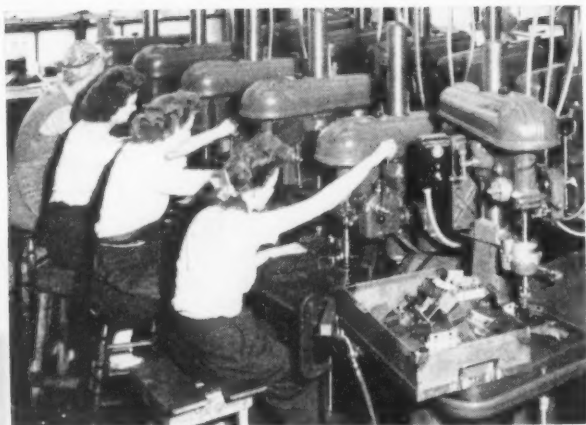
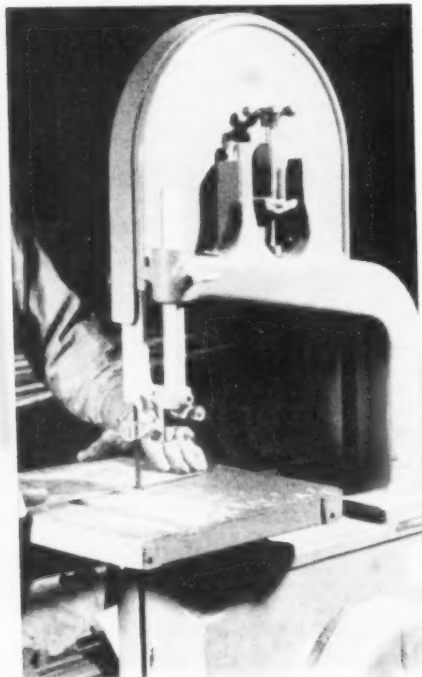


Fig. 7. A battery of drill presses arranged in such a way that lifting and moving of work from operation to operation has been eliminated.

were precision tools, not in the strict sense of high precision, but in the sense that they were accurate and would produce quality merchandise. For example, the Electrical Installation Fabricators Company of Chicago, Illinois,



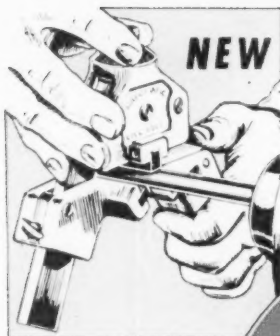
processed bakelite. These applicatoinns are all unique. The setup as shown in figure 6 is very interesting in this: after the strips of bakelite have been parallel-squared on the 14" band saw, they are fed through the lathe head-stock and come out a round piece such as dowel rod would be. Many of these jobs require very close tolerances. A job they were doing on the Unisaw for example had to be held to .005, and in some casse they had to hold it to .002.

The U. S. Thermo Control Company of Minneapolis, Minnesota, manufacturers of transport refrigeration systems, estimate that their six-gang 17" drill press unit speeded up production on important contracts at least 50%. Some of the advantages that they found in the light machine tools were the coolant system that reduced wear of the drills, the automatic feed, the variety of drill speeds within easy range or reach, and the single table that eliminated lifting of work pieces, figure 7.

And, as for low maintenance costs and low upkeep, the Milwaukee Sewer and Turbine Company has used light machine tools for the past 12 years when they first purchased a 14" drill press. This drill press has been in constant use ever since and is used for drilling operations on brass augers for

Fig. 8. A metal cutting band saw replacing hand sawing operation.



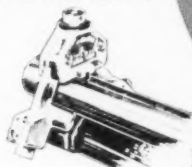


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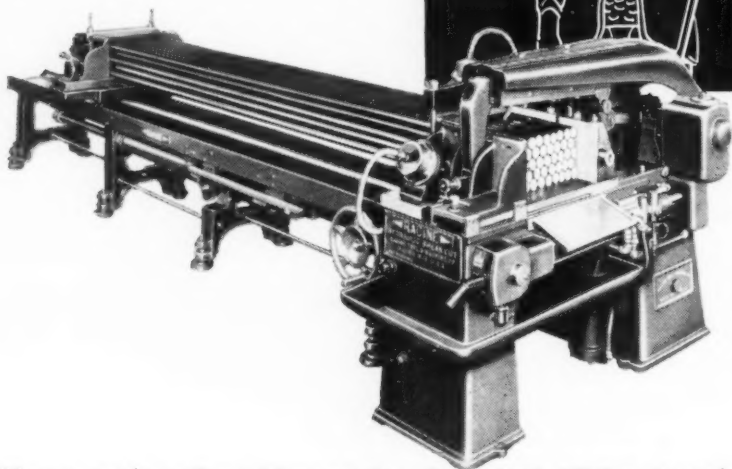
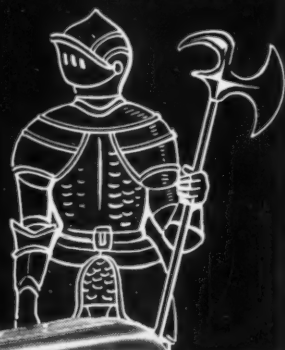
Because of the fine service of their other light machine tools, this company added a 14" metal cutting band saw and equipped it with a metal cutting band saw blade. Inasmuch as all sheet metal was formerly cut by hand, the addition of this saw has more than tripled the output of the sheet metal parts used in production of sewer turbines, figure 8. The good service rendered by these light machine tool units has contributed greatly to the increased

production of this plant.

So today, light machine tools have won a permanent place in the modern industrial plant, and management is today meeting the problems of increased production costs and lower prices through the increased use of light machine tools, which because of their low initial cost, low maintenance, long life, portability, and many other factors, are money and time savers for most modern industrial plants in most of their departments. THE END.



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Deburring parts with a portable grinder . . .  
Spray painting of landing gears . . .

These are some of the operations where the use of compressed air has realized production economies for one manufacturer. Some of the good air compressor practices are also described in this article.

**M**ENASCO Manufacturing Company, of Burbank, Calif. uses compressed air in several ways in the manufacture of airplane landing gear and of jacks for airplanes, railroads and garages. Some of the noteworthy applications for this versatile power are described here.

Supplying the power to these applications, is a two-stage compressor of 1055 cubic feet per minute capacity, figure 1. A compressor of approximately half that capacity serves as a standby and also is operated in place of the main compressor when air requirements are reduced, for example on Saturdays or when sandblasting is not in progress.

Following the main line and its branches takes one to every working area of the plant. Especially interesting among the many uses for air was the air-operated profiler attachment on the engine lathes, figure 2. The ingenious device has helped the company to turn a highly skilled machinist's work into a quantity production job in many cases.

At the rear of the lathes is an air cylinder with 4-way valve. The piston is tied in with the cross slide to hold the stylus against the profile blade. The profile template is in the front to avoid picking up any errors in the rear taper attachment that might come with normal wear of the lathe.

Completely accurate work is obtained with the front template arrangement.

There a few "bugs" in the first experiment by the Menasco engineers, but they were easily overcome. The profile blade pattern must make allowances for the thickness of the stylus, the tool bed and other considerations which would vary in different shops, but once those details are worked out, the problems disappear.

Care was taken to keep air dry in the cylinders by using water traps at each lathe. Air pressure is regulated between 30 and 40 pounds per square inch, according to the style on the template and, for example, pressure is automatically reduced where steep angles are to be encountered.

Consideration was given to the use of springs for regulating and controlling the automatic operation, but it was found that compressed air could be more closely regulated and that it was responsive to the slightest change in

the pattern and thus assured accurate work. It also was more simply applied to the profiling operation.

The lathe attachment described was worked out during the war. At the time, the particular cylinder operation being undertaken required a skilled machinist a full 8-hour day to turn out one cylinder. After the Profilers were perfected, machine operators could turn out 16 of the cylinders a day and the highly skilled machinists became available for other essential work. Since the attachments continued in use for peacetime production, no comparisons are available for time now being saved, but the savings would approximate those of wartime. All the operator has to do is to throw the feed on and the carriage follows the front profile template.

Every use for compressed air at Menasco Manufacturing is not always as unusual as the company-devised profiler, but the production economies being effected are as frequently ob-

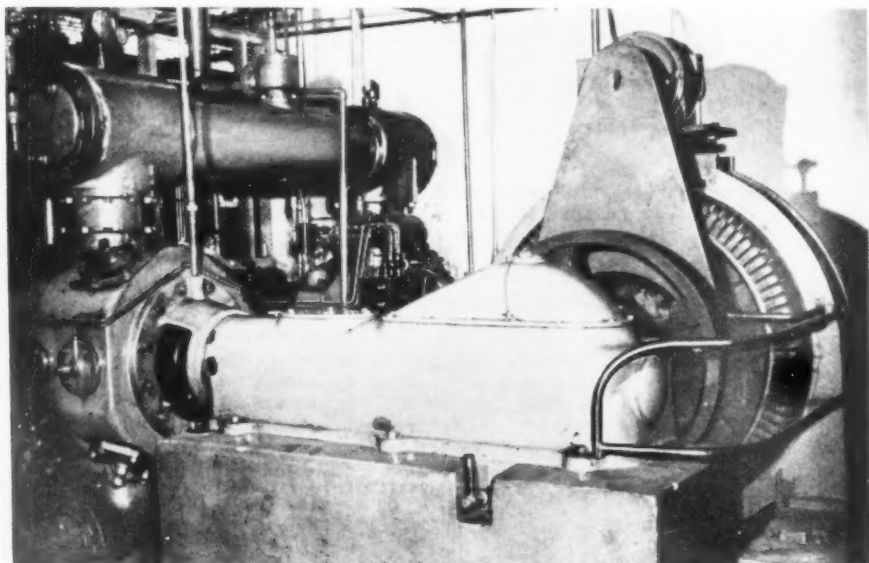
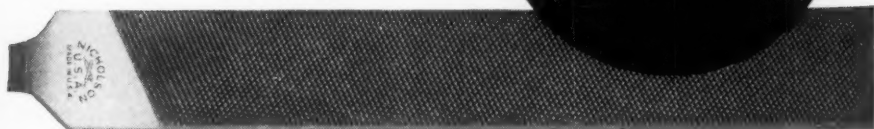


Fig. 1.—This two-stage air compressor produces the power for many labor-saving operations throughout the Menasco Manufacturing Company plant. The compressor capacity is 1055 cubic feet per minute.

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How can you tell when file teeth are in tip-top shape? You can't see file-tooth quality. The surest way is to look for the trademark. If it's a Nicholson or Black Diamond, you're on the right track. For these world-famous files are made with great care in selecting steel of the right grain and quality; and with special attention to the hardening of their "business

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Measure the stretch of your file dollars by the number of efficient file strokes you get out of a file—and your choice will inevitably be Nicholson or Black Diamond brand. Industrial distributors who value your patronage know they can hold it under the Nicholson guarantee of *Twelve perfect files in every dozen*.

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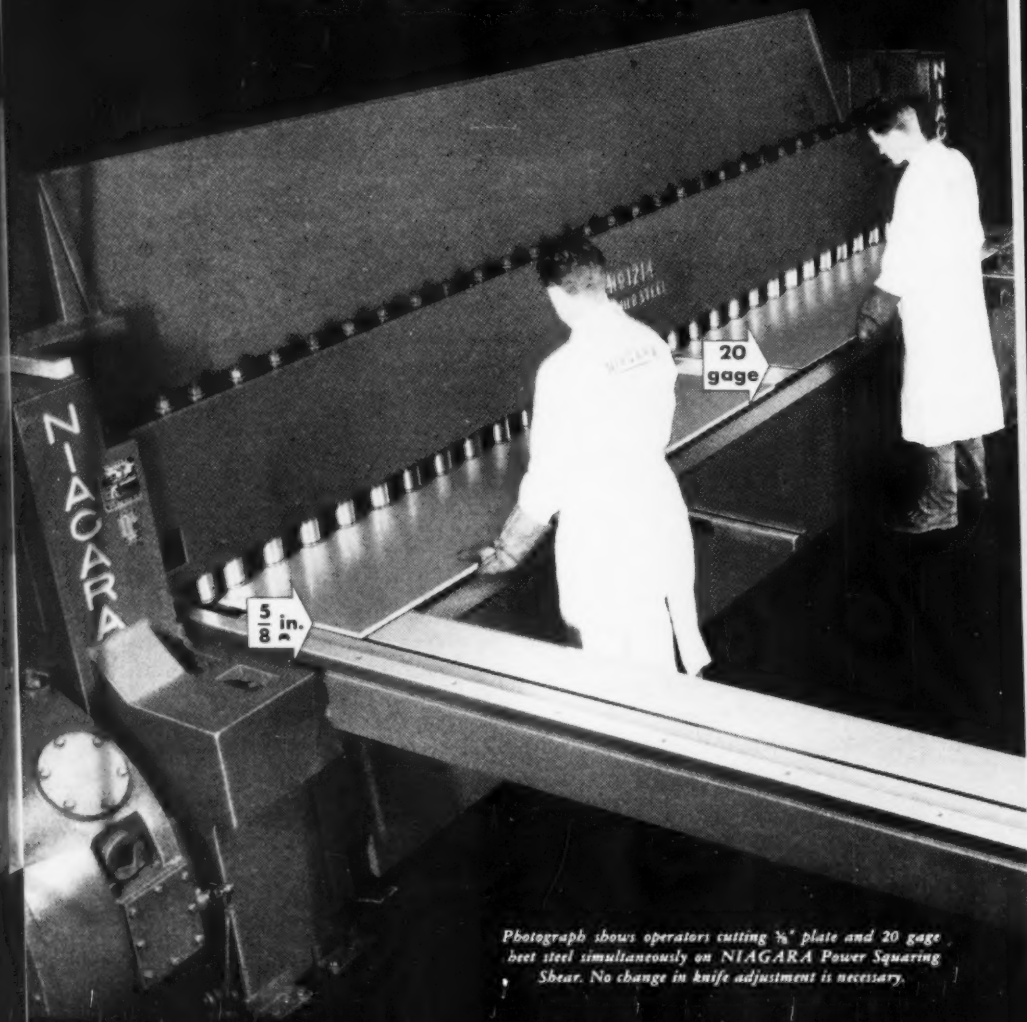
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*Photograph shows operators cutting  $\frac{5}{8}$ " plate and 20 gage best steel simultaneously on NIAGARA Power Squaring Shear. No change in knife adjustment is necessary.*

The ability of Niagara Power Squaring Shears to cut thick and thin plate both at the same time with the same knife setting is a dramatic demonstration. Visitors at our plant can see this done every day. There is no necessity for tinkering with the knife adjustment.

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Engineering Design of*

# NIAGARA

## POWER SQUARING SHEARS

● There is no compromise with sound, proven engineering when it comes to NIAGARA shear design and construction.

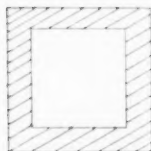
Accurate cutting depends primarily on rigidity of the shear's components.

For bed, crosshead and holddown NIAGARA uses CLOSED BOX SECTIONS to resist with minimum deflection the horizontal, vertical and diagonal or torsional loads to which every shear is subjected.

**NO OTHER SECTION WILL DO THIS JOB AS EFFICIENTLY.**

Angle or channel shaped sections have long since been abandoned for use on NIAGARA Power Shears.

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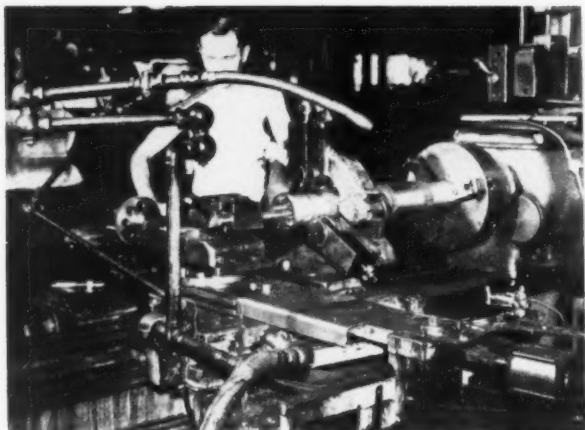


Fig. 2.—Engine lathes on production work are equipped with the profiler attachment shown here. Air cylinder at rear of lathe works on cross slide to hold the stylus against the profile blade. The profile template is at the front of lathe. The job on the machine is reaming the interior of a landing gear shaft.

served. For instance, the use of pneumatic portable grinders is found throughout the plant for cleaning welds, removing burrs, figure 3, and similar work.

To be fully effective a portable tool must be portable in fact as well as in name. By using air-operated grinders, Menasco Manufacturing finds that it is more convenient to move the portable tools around from one place to another because of their light weight in relation to the power which these tools have. That condition gives more production per hour and less fatigue for workers doing the grinding.

Plant maintenance is also simplified due to the fact that air outlets are available any place in the plant. Air hammers speed the work of concrete breaking for service lines or new machinery foundations while air drills cut the time required to tie down the machinery.

All parts of heat treat are sand-blasted and it is this single operation which consumes the largest volume of compressed air. Spray painting, figure 4, of all finished products is the second largest consumer of air. All machines have air hoses for cleaning and some of the machines, such as the auto-

Fig. 3.—Deburring a part for landing gear is one of the typical uses for a pneumatic grinder, as shown here. Pneumatic grinders of several sizes and types are used, each one being chosen according to the work to be done.



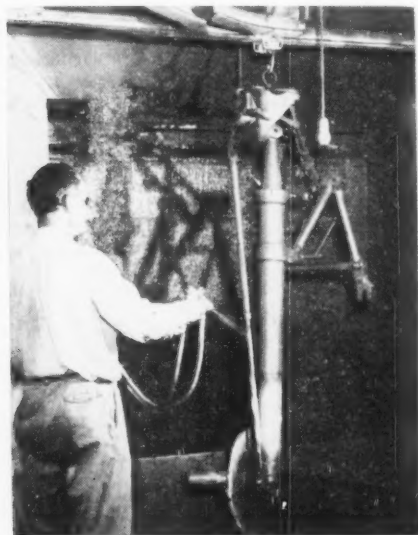


matics, have air chucks to reduce loading and unloading time on the machine and to improve accuracy of work.

In addition to the many uses of compressed air from the plant lines, the company also has a special small compressor for testing P-80 landing gear. This compressor, taking in refrigerated air, delivers 360 pounds per square inch pressure. With this pressure applied to the landing gear, small air leaks in seals and elsewhere are detected under conditions more severe than would be encountered in flight.

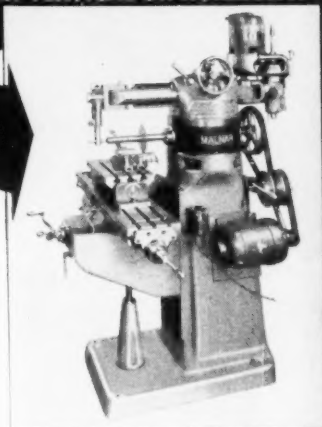
With the testing exception, other compressed air needs are supplied from the central compressor. Pressure on the lines is maintained at around 95 pounds per square inch and regulated at the points of use according to the desired pressure. In addition to having ample air compressor capacity to assure constant pressure under all conditions, the Burbank manufacturer also

Fig. 4.—Spray painting of this landing gear puts on the final touch before delivery. From start to finish compressed air has played a part in the production of this precision equipment.



## MALNAR MAKES YOUR BRIDGEPORT

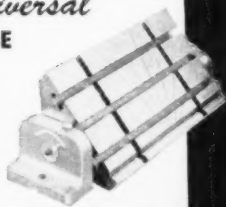
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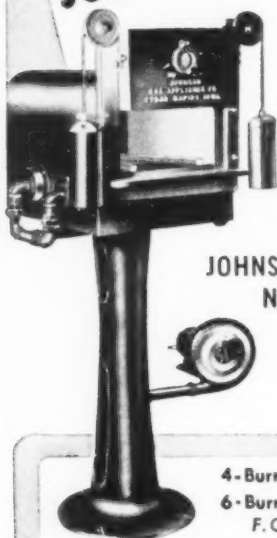
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follows other good compressed air system practices.

An example of one of these is noticed in the size of the main line. It is 4 inches in diameter and reduces down in size as it extends to points of use. In this connection it is worth noting that the installation cost of an air line including labor would not vary much between a 3-inch and 4-inch line, but the difference in size can mean pressure loss. For instance, a 3-inch line, 1000 feet long, will handle 500 cubic feet per minute with a 2.8 pound pressure loss, while a 4-inch line will pass 1000 cubic feet per minute with about the same pressure drop.

Lines are tested regularly for leaks as a further precaution against the waste of power. Water traps are placed along the lines to remove moisture from the air lines. These and other routine precautions help the company operate its air equipment and tools at full efficiency. Inadequate pressure at the point of use is avoided because that condition is the one single factor which contributes more than any other to reducing the effectiveness of air power.

Menasco Manufacturing Company's position as one of the leading manufacturers of airplane struts is in no small degree due to ingenuity in manufacturing methods and making the best use of its production facilities. A few examples have been cited in connection with this description of the company's uses of compressed air.

Data and photos for this article were obtained through the courtesy of the Compressed Air and Gas Institute and the Menasco Manufacturing Co., Burbank, Calif.

**THE END.**



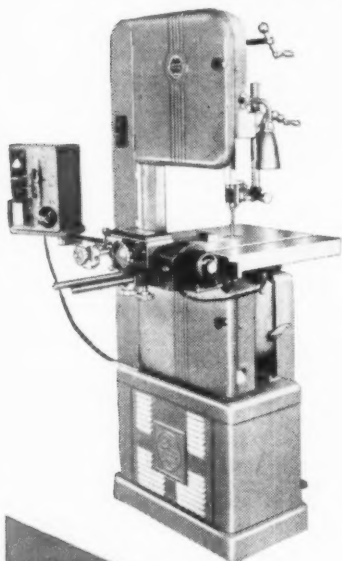
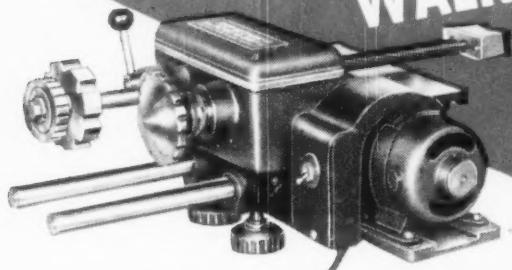
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Here is Walker-Turner *design* at work, cutting production time and costs. Ask your W-T machine distributor to show you this new, more efficient Power Feed and other cost-cutting equipment in the complete Walker-Turner line. Send for catalog.

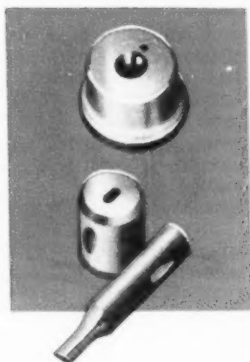
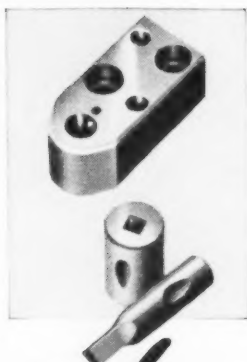
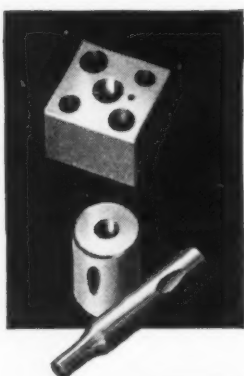
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# what you can do about the equipment crisis

by L. W. Scott Alter,  
President and General Manager,  
The American Tool Works Co.

America's production facilities are not in good shape; and are getting worse. If the present trend continues many plants will face "mechanical bankruptcy". What you can do about this is detailed by the writer whose ideas on appraising the worth and value of your present equipment is well worth study.

**A**NY COMPANY can become "Mechanically Bankrupt" and still be "Financially Solvent" provided, of course, that the money thus squeezed out of the shop economy has not already been dissipated in unwarranted dividends, excessive inventories or unprofitable extra-curricular activities.

This truism may readily be expanded to include a whole nation, with a proviso that the funds withheld from the nation's economy through taxation have not already been dissipated by political extravagances, in which case the country will have neither productive efficiency nor money in the bank.

If the present trend of the inadequate replacement of old machine tools is not reversed, by 1955 more than three out of every four machine tools in this country will be at least ten years old.

In fact, before even another twelve months has rolled by, there will be an additional 15,175 added to the roster of "Decade-Plus" machine tools.

Conditions like these call for deep and searching study, for unless we fully understand a problem, its solution is likely to become evasive. Therefore, I am going to ask you to cast aside for a few minutes your traditional approach to a Machine Tool Replacement problem and, parenthetically, I shall find myself also obliged to ask the bookkeeper to forget he ever made an entry in a set of books.

Let's forget about machines as such and think of them as an investment, or to put it bluntly, their current convertibility into money. What are they worth? Which one of three sets of figures are we willing to accept for our purpose? This, in my opinion, has been the bugaboo blocking straight thinking.

If we accept "Residual Book Value" as our measure, we are simply taking over what the Internal Revenue Department has dictated, i.e., cost less 5 percent a year (on the average). Nobody can seriously think of this as true expression of value.

Then there is "Sound Insurable Value" as prepared by an accredited appraisal company. This usually starts out with a "Replacement Cost" of a machine—which is then depreciated at some special and very secret percent, after which a package deduction is made for obsolescence and a second lump sum is taken off for accumulated and/or concealed maintenance. At best, this is still an estimate, and you know the definition of an estimate: an intelligent guess.

If we want to know what our machines are worth in convertible dollars, we have to apply that age-old formula, "What a willing buyer—will pay a willing seller." At first glance, this seems difficult of accomplishment, but it's really not. We have done it at our factory and are continuing to check the market for our machine tools at regular intervals.

It may interest you to know how this is done. First you prepare a Plant Equipment Book—containing an adequate description of each machine.

This book is turned over to a Used Machinery Dealer so that he can insert—after each machine—what he is willing to pay the owner for it, if he should decide to sell. It is understood between both parties that if the owner discovers any machines that appear to be worth more to the dealer than they seem to be worth to the owner, the dealer will be given a chance to make on-the-ground inspection—before his offer becomes firm.

In anticipation of the questions, which this proposed program undoubtedly will raise, I want to suggest that the dealer will probably undertake this pricing job without any charge because of the probability that the program will result in his getting something to sell.

The used machinery dealer is likely to make a truly objective offer, if he does not know which one, if any, of the machines the owner will decide to dispose of, since the owner will be under no compulsion to sell unless it seems opportune and advantageous for

## CAN YOU FORGE OR CAST THE ANSWERS TO THIS QUIZ?

By Herman Reichardt, Consulting Engineer

Count ten for each correct answer. 90-100 is excellent; 70 to 90 is good; 50 to 70 is fair. Below 50 . . . well, you're probably a whizz at something else.

1. Blast cleaning is a process of cleaning by driving solvent solution, gravel or shot against a casting. \_\_\_\_\_
2. The sprue is that part of the die known as the body, gate, or face of the die. \_\_\_\_\_
3. Insert die is a die set in a mold after pattern is removed, impression of a forging or portion of die removed before making mold. \_\_\_\_\_
4. Proof is the first mold, the detailed blue print, a die impression in material. \_\_\_\_\_
5. Edger is the outside of the die, a removal portion of die or portion of die which distributes metal. \_\_\_\_\_
6. The tonghold is the connection of the forging to stream of metal, part of stock by which operator grips stock, something which holds castings apart. \_\_\_\_\_
7. Flashpan is the provision for the overflow of metal, hot metal that seeps out, center of casting. \_\_\_\_\_
8. The shoe is the bottom of the die, a holder to support starting part of casting, the tip of the casting. \_\_\_\_\_
9. Planish is grinding excess stock, rolling forging in pair of dies, separating castings. \_\_\_\_\_
10. The undercut is the smaller part of casting, bottom of casting, section which would lock themselves into die impression. \_\_\_\_\_

Answers to quiz on page 244.



him to do so. This desirable situation is not attained when machines must be moved by a specified time.

With this set of figures available, you have established a jumping off point for all sorts of excursions into the various financial aspects of your machine tool investment.

One of these is developed in the chart, "Amount of Investment in Engine Lathes which is Recapturable". The points scattered over this chart were computed directly from quotations given us by a used machinery dealer. For example, if a particular lathe costs \$10,000 to replace and the dealer offered us \$5,000, the percentage would be 50%. The curve is drawn through these points as we interpret them.

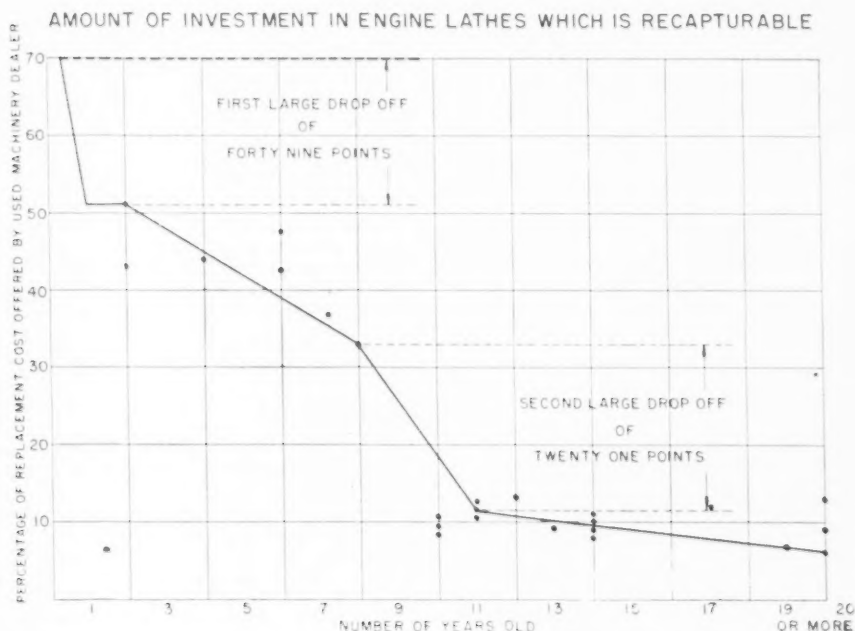
Let's see what we can read from the chart. The replacement machine again will be priced at \$10,000; almost as soon as delivery is taken, its value on the second hand market becomes \$5,100.00. This isn't a strange phenomenon be-

cause we all know what happens to the value of our new automobile when we drive it off the dealer's show room floor. The market price still remains the same up to the end of the second year.

For the next six years its value recedes until at the end of the eighth year it stands at \$3,300.00.

Now comes the second large drop off. In three years the recapturable money drops \$2,100 leaving a residual of \$1,200 which then recedes quite slowly until the Grim Reaper takes over.

We think that the second large drop off is caused for two reasons. First, there is a real likelihood that the manufacturer has by now introduced a new model. This has a very drastic effect on the used machinery market price. Secondly, the used machinery dealer has learned the hard way that machines of about this age are likely to have concealed maintenance requirements, for which he will have to



spend his own money, in order to put them in saleable condition. This is just like an automobile which is due for a new set of rings, tires all round, a battery and a radiator that needs soldering.

There are several questions that this curve causes one to ponder over:

- (a) Wouldn't it be better to move a certain machine out, instead of undertaking a major overhaul?
- (b) Is it to our advantage to take the impact of the second large drop off?
- (c) Perhaps our disappointment in some of the offers made for our very old machines wasn't entirely realistic? It could have been that we didn't have much to sell.
- (d) Since this curve reflects a spot check as of September 25, 1949, it is certain to change up or down with changing market conditions. Therefore, we must determine, among other things, whether the time is right.

I could proceed at length and claim numerous collateral benefits for a program like this but these are as well known to you as they are to me. Suffice it to say that anything which will promote a definite and periodic survey of one's plant equipment is a very

sound and valuable practice to follow, and by this I do not mean just taking an inventory.

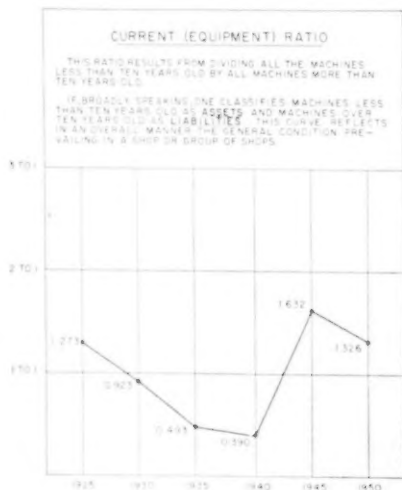
While we are talking about curves I should like to point out some features of the chart called "**Current (Equipment) Ratio**". This undertakes to show in financial terms the condition of a plant's mechanical well being. The financial "Current Ratio" is perhaps the most commonly quoted figure appearing on any company's balance sheet. It is arrived at by dividing Current Assets by Current Liabilities.

The introduction of the word "Equipment" between the other two words, namely, "Current" and "Ratio," is made possible merely by classifying machines younger than ten years old as "assets" and all others as "liabilities" and then proceeding exactly as above.

To orient ourselves, I shall merely mention that the first point (year 1925) shows that at that time the "Ratio" was 1.27/100 to 1. It also means that nationally there were 127 machines less than ten years old, for every 100 machines which were older. An upward movement of the curve is favorable, while a downward one is unfavorable.

Line curves, of this kind, are most valuable as indicators of trends, so it is somewhat shocking to note that this last inventory shows the ratio to be about the same it was in 1925, despite the tremendous war production of our industry; that despite the boom period of the late twenties, the 1930 inventory shows clearly that people at that time were buying paper, not producing facilities. It also explains why preparation, for the requirements of World War II, was so long in being met, because as late as 1940 the productivity of our plants was at the lowest ebb in many years.

This inevitably leads up to the matter of preparedness for another conflict, should we again have to face such a catastrophe. The great danger, as I see it, is that we shall conclude that the tooling up phase, for such an eventuality, is well in hand now that "Tentative Production Schedules" have been issued to all builders. Personally, I cringe when I think of those almost



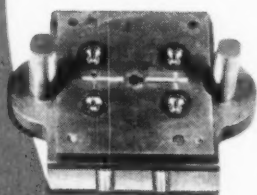
## Plastic Mold Die Produced for 50% Less...

The mold for these parts is mounted in a standard Danly Die Set... savings in the cost of the die set alone amounted to over \$200.00!

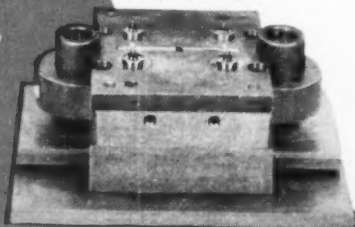
A special feature in this design is movement of the die set guide post against the ejector plate to return the ejector sleeves to starting position. When the die opens, the ejector plate is pushed up in a stripping action by a permanent stud attached to the machine.

IN A

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forgotten fateful words from high sources, "OR ON ORDER." Are we not deluding ourselves in still another quarter with push button war-ideas? You can't find anyone who will not agree with you, that we shall have little or no time to get ready, now that the countries which formerly took the first shock are weakened, demoralized and depleted. And yet, we are virtually expecting that merely because "Tentative Production Schedules" are on file the factories of this land will rise to peak efficiency in time, regardless of how obsolete they may be, on "M" Day. I am on record as saying IT JUST DOES NOT MAKE SENSE!

During the same decade from 1930 to 1940, Mr. Hitler was whipping his machine tool industry into a frenzy of activity; he offered his metal working industries the privilege of writing off in the first year the entire purchase price of any new machine tool they bought. While this was going on, our situation became more than twice as bad as it had been in 1930. The con-

trast of policy is really something to conjure with.

So far we have been thinking in terms of topflight factories, to a large degree, but who can gainsay that the more all out a war becomes, the more war production will infiltrate down the line, even into the "alley shops"? If these lesser known, but nevertheless integral parts, of our production potential are left in deplorable condition, what help will they be able to afford in an emergency?

In striving, therefore, to build the best equipped front line factories, we are automatically helping the second and third line shops to acquire machines, on the second hand market, which will strengthen them and thus, our whole production situation.

The trend line of the "Current (Equipment) Ratio" is pointing down. This is a national danger signal of the first moment.

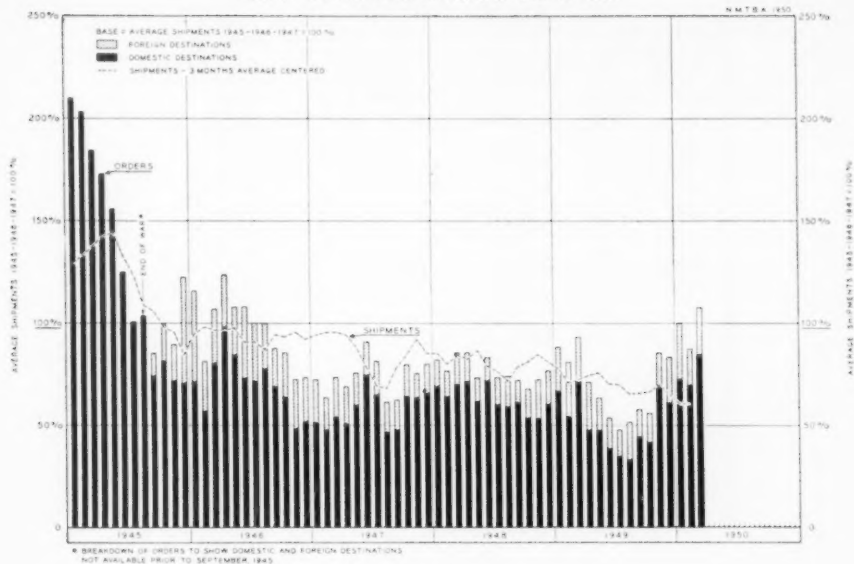
It is easy for an individual company or a lending bank to have a particular company's curve superimposed on this national average for comparison. In my way of viewing it, this "Current (Equipment) Ratio" is a yardstick that should be given weight along with many other figures on the Balance Sheet in evaluating a company's position.

The third chart I wish to discuss briefly is the "Index of New Orders and Shipments of Machine Tools". The index used herein is the average shipments of the years 1945, 1946, and 1947 which is selected to be 100 percent. As was expected, the chart shows a large slide off of business after the war. Nevertheless, the wave of rapidly increasing costs for labor, has contributed in a large extent to the unexpectedly favorable level of new machine tool orders in the post war period. Severe competition, from here on in, will demand an even larger replacement program. Full realization of this is evident from the January and February figures on this chart. But let us not forget, that despite this, the "Current (Equipment) Ratio" curve is headed downward. It is appalling how



Just a few gadgets, Hadley, to help you get started faster in the morning.

# INDEX OF NEW ORDERS AND SHIPMENTS OF MACHINE TOOLS



rapidly the years roll by for older people and the same is true of aging machine tools.

If this paper has served no better purpose than to tantalize you into doing some searching on your own part, its usefulness will have been established.

There have been two recently published studies of "Replacement Formulas," one by the National Machine Tool Builders' Association called, "Computing Return on Invested Capital," which deals with direct labor costs. The other, published by Machinery and Allied Products Institute, carries

this same kind of an examination into full and complete detail. Between the two you are able to find something which will most certainly meet your needs.

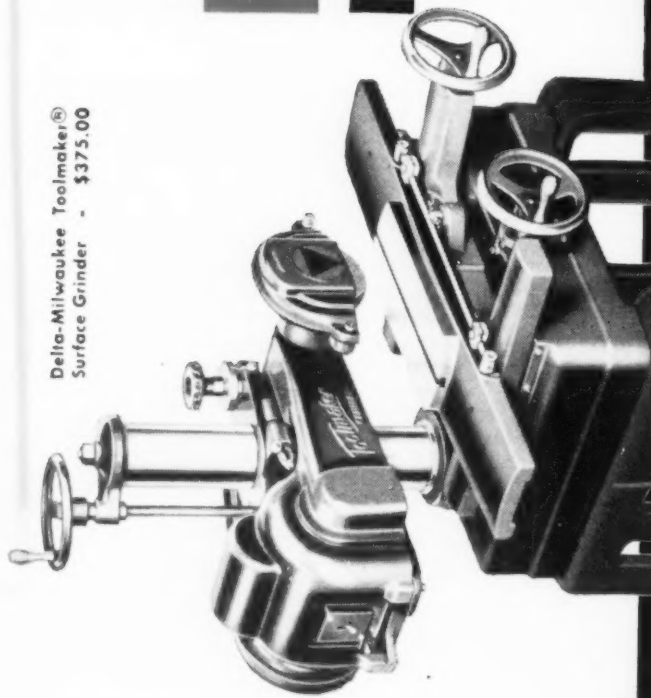
Just one last word in answer to those who advocate a "Policy of Stagnation." Unless mechanical aids are generously used to step up the present output per man, so that his real wages, now and later on, will increase, you may be sure that any alternative suggested thus far will only result in ten-cent dollars for these employees when they reach the age of retirement.

**C. L. Stocker** has assumed sales and engineering responsibilities in the San Francisco area for The Lincoln Electric Co., Cleveland. The office is located at 1303 Stanford Ave., Emeryville, Calif. The welding engineering staff has been increased by the addition of **M. F. Yale** and **T. Nichol**. **A. L. Patnik** has been appointed welding engineer in the Seattle district for Lincoln, with offices at 1914 Utah Ave., Seattle.

**George A. Ingalls**, AMF comptroller, and **John W. Herman**, treasurer of Lukens Steel Co., Coatesville, Pa., have been elected recently to the board of directors of American Machine and Foundry Co., New York, it was announced by Morehead Patterson, AMF board chairman.

**F. H. Clark** has been named sales manager for the Stanford Control Division of the Westinghouse Electric Corp., at Beaver, Pa.

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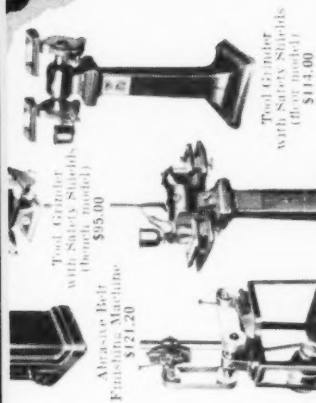


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# the most complete grinder line



Tool Grinder  
with Safety Shields  
(Optional)  
\$95.00

Abrasive Belt  
Finishing Machine  
\$121.20

Tool Grinder  
with Safety Shields  
(Optional)  
\$114.00

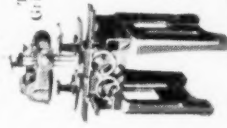


Toolmaker's  
Chip Breaker  
Grinder  
\$412.50

Bench Grinding  
Machine  
\$130.75

Toolmaker's  
Grinder  
\$425.00

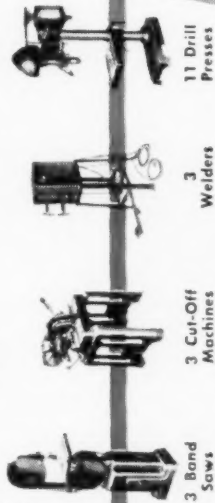
Motor and switch extra in some cases. Prices subject to change without notice.



**LOOKING** for a machine to cut your grinding costs? Delta has the answer—bench- and floor-model grinders of many types with the exact current and speed you need to meet your requirements—surface grinders, standard tool grinders, carbide grinders, chip-breaker grinders, tool-and-cutter grinders, abrasive belt machines, etc.

You'd expect to pay much more for the all-around high quality of low-cost Delta grinders. For example, the Delta-Milwaukee standard tool grinder has illuminated safety shields built in. Wheel guards meet

*Sold only through authorized dealers. Easy time-payments available. Look for the name of your Delta dealer under "Tools" in the classified section of your telephone directory.*



3 Band  
Saws

3 Cut-Off  
Machines

3  
Welders

11 Drill  
Presses

**Plus**  
a complete selection of:

- 6 Circular Saws . . . 4 Jointers . . . Scroll Saw . . . 4 Radial Arm Saws . . . 2 Shapers
- . . . 2 Saw-Jointer Combinations
- . . . Mortiser . . . Lathe . . .
- 2 Buffing Machines . . . 2 Planers.

## 53 Machines — 246 Varieties

strict safety regulations. Ball bearings are lubricated for life. Tool rests are completely machined, fully adjustable.

Delta, you know, is the industry's most complete line of metalworking and wood-working machines. It's the only line with complete accessories to make every tool do more jobs — and often save you a larger investment in other machines.

So, for a grinder — or any other machine — look to Delta's complete, quality line first. Send coupon for catalogs and bulletins on the entire Delta line.

### POWER TOOL DIVISION

**Rockwell**

Manufacturing Company

MILWAUKEE 1, WISCONSIN

DELTA • MULTIPLEX • CRESCENT • HOMECRAFT

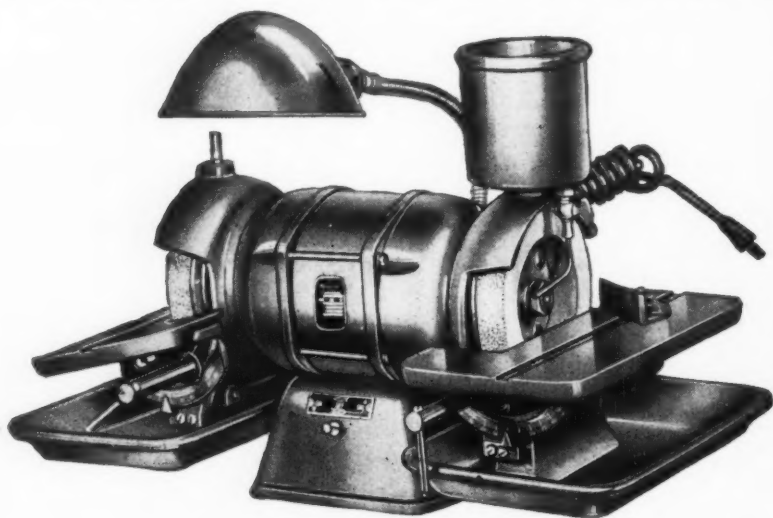
**Tear out coupon and mail today!**

Power Tool Division  
ROCKWELL MANUFACTURING CO.  
604G E. Vienna Ave., Milwaukee 1, Wis.  
Send me free catalogs and bulletins  
on the complete Delta line.

Name.....  
Title.....  
Company.....  
Address.....  
City..... (.....) State..... M-48

# Baldor

## Grinders you can't **OVERWORK**



The  $\frac{1}{2}$  hp motors that power these Baldor Grinders have no commutator, no centrifugal switch, no brushes—really trouble-free motors that will not burn out even when over-loaded repeatedly. Electronically balanced with 1/50 ounce of perfection, the armatures rotate at 3400 RPM without vibration—an engineering achievement that makes true precision work possible. Only first-grade wheels are used, and we re-check these at our plant for balance; Baldor Patented Balance Flanges are added when necessary. These grinders are built to do precision work and take plenty of punishment at the same time.

Phone your industrial distributor now or clip this ad to your letterhead and mail for grinder bulletins.

### **BALDOR ELECTRIC COMPANY**

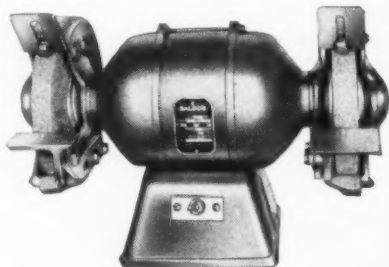
*Motors - Grinders - Battery Chargers*

4368 Duncan Ave.

St. Louis 10, Mo.

**ABOVE:** Carbide Tool Grinder with reversible motor for sharpening both left and right hand tools.

**BELOW:** No. 7120, *HEAVY PRODUCTION TYPE* small grinder, 36 & 60 grit wheels; will stand plenty of abuse.

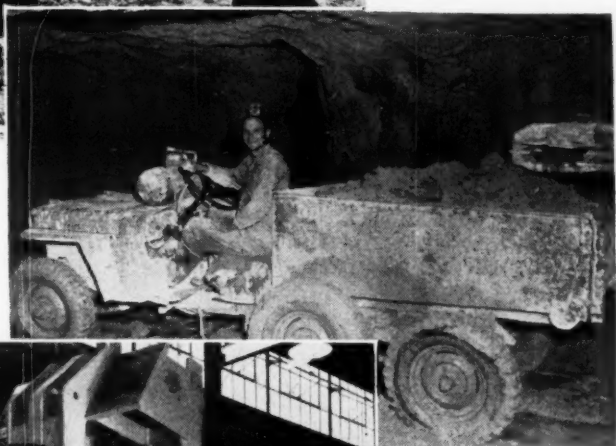


## Views from Here and There . . . . .

Digging trenches for laying pipe is a lot easier than it used to be. Contractors are laying a gas line which when completed, will extend from Eunice, La. to New York. It is scheduled to be completed by September, 1950.



Using a Jeep to mine bauxite. Oversized tires are mounted in tandem, two on each side of the carrier. Every time the Jeep moves away from the electric mucker, it hauls two tons of ore to the shaft.



Co-designers of the 60,000 pound capacity Skylift Giant, world's largest steel handling truck, feel pretty good about it after the huge machine passes its test at the Automatic Transportation Company, Chicago.

# CHICAGO

## Powerful

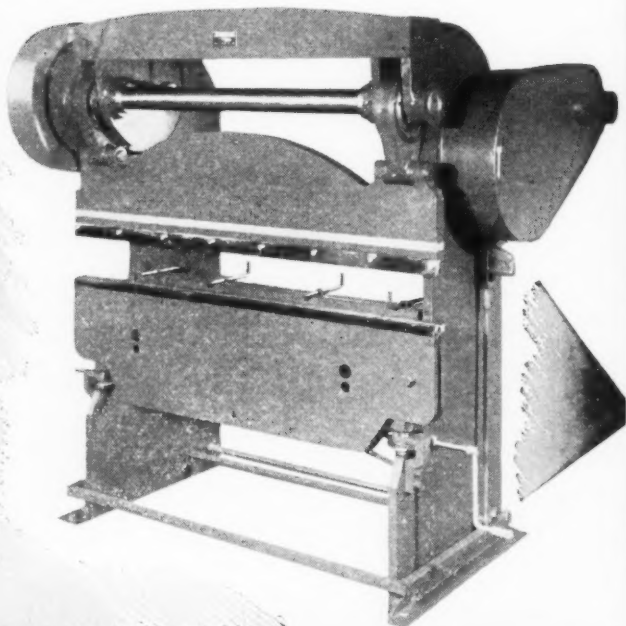
TYPE "300"

## STEEL PRESS BRAKE

A Press Brake made to exacting standards and built to take hard and continuous use.

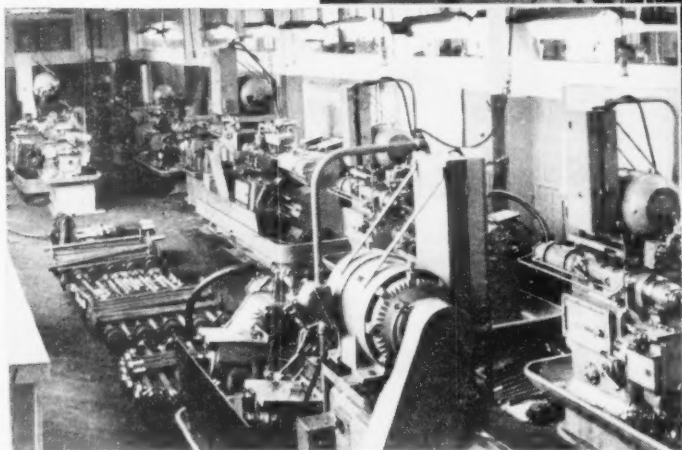
This press will do your work well and efficiently. Dependable service is guaranteed and proven by many years of operation. Variable speed drive for speed and safety.

This is only one of the many fine presses made under the banner CHICAGO. There is a CHICAGO steel press brake to meet your requirements. Your die problems are ours—let us help you.



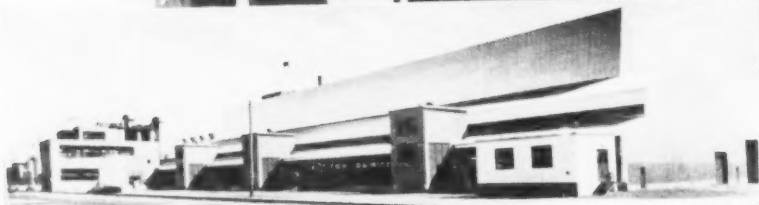
**DREIS & KRUMP MANUFACTURING CO.**  
7440 LOOMIS BLVD. . . CHICAGO 36, ILLINOIS

Alice Nugent, General Electric employee, demonstrates a new G-E electric calculating machine that can keep a continuous check on reject rates in production operations. The equipment counts the number of items produced and the number rejected, and if the rejects rise above a predetermined level, the needle on the motor beneath the operator's hand moves to the right, calling attention of supervisors to a production trouble spot. In practice, a battery of such indicators would be located in a central spot, away from production lines.



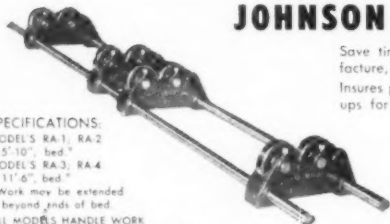
Group of Model "LR" Automatic Lo-Swing Lathes undergoing rigid tests on customer's work before shipment from the Seneca Falls Machine Co., Seneca Falls, N.Y. These units are set up and operating under conditions which duplicate those in the customer's plant, a Detroit automotive manufacturer. Operations include facing and turning the flanged end, and turning and chamfering the splined end of axle shafts simultaneously.

New officers of the American Society for Tool Engineers. Front row, left to right: H. E. Collins, Hughes Tool Co., first vice president; H. L. Tigges, Baker Bros., president; J. J. Demuth, Sligo, Inc., second vice president. Rear, left to right: G. A. Goodwin, Standard Electric Co., treasurer; R. F. Waindle, Elgin National Watch Co., third vice president; W. B. McClellan, Gairing Tool Co., secretary; W. A. Thomas, Ford Motor Co. of Canada, Ass't. sec'y-treas.



New 2 million dollar plant built by the Carborundum Co. in Vancouver, Wash. The plant will be devoted to the production of silicon carbide.

## JOHNSON ROTARY WORK ALIGNER



### SPECIFICATIONS:

MODELS RA-1, RA-2

5'-10", bed<sup>1</sup>

MODELS RA-3, RA-4

11'-6", bed<sup>1</sup>

<sup>1</sup>Work may be extended

beyond ends of bed.

ALL MODELS HANDLE WORK

MATERIAL FROM 1" TO 24" DIAMETER

LOAD CAPACITY 1500 lbs. (All Models)

Save time and trouble handling materials requiring rotation in Manufacture, Assembly, Welding or Repair.

Insures perfect alignment of two or more units. Eliminates expensive set ups for miscellaneous jobs. Adapted to centered or uncentered work.

Checks alignment or run-out on any circular materials.

Tubing, shafting, etc. is easily rotated for uniform welding, joining, cutting, or welding fittings or flanges.

A precision tool of finest material and workmanship. Simple.

Durable. Write today for complete description.

**JOHNSON MACHINE WORKS**

619 MENOMONIE STREET

EAU CLAIRE, WISCONSIN

TELEPHONE 8314



# From the DUMORE Archives

and, after all, we've been at it over 35 years



Hold it Thrigby! A DUMORE lathe set-up will cut your production costs in half!

## This may be *STRETCHING* it!

but you'd be surprised how many smart production men are re-discovering how low-cost Dumore Tool Post Grinders can cut their costs.

On short run jobs a Dumore is on and off the job while many machines are still eating up set-up time. (Average set-up time on a Dumore job is only 5 minutes.)

On longer runs a Dumore on a lathe, miller, shaper, planer or standard grinder gives you lower overhead (Du-

mores cost only a fraction of big machine price) . . . plus a lower operator rate to keep your costs in line.

You'll want to see the interesting set-ups shown in the new Dumore Catalog. Check them against your own jobs. Write for it today — no obligation.

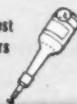
**THE  
DUMORE  
COMPANY**

Dept. G-27 Racine, Wisconsin  
Export Address: 13 East 40th Street,  
New York 16, N. Y., U.S.A.

DG-6



Tool-post Grinders



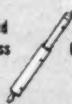
Handgrinders



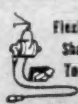
Drill Spooler



High-Speed Drill Press



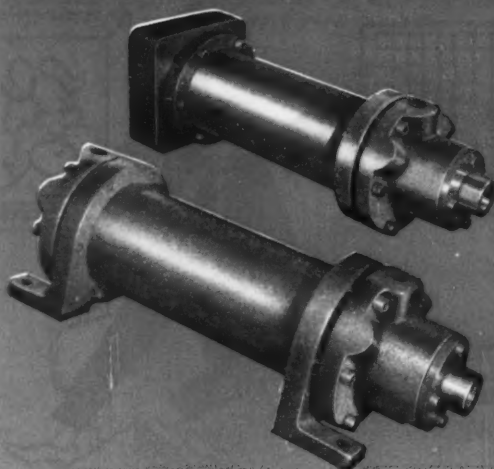
Quills



Flexible Shaft Tools



## SPECIFY LINDBERG AIR CYLINDERS



*for*

**PULLING  
PUSHING  
LIFTING  
FORCING  
CLAMPING  
PRESSING**

### *No costly mechanisms needed!*

Lindberg Double Acting Air Cylinders are proving their adaptability and worth in a wide variety of industrial uses. These simple, dependable, efficient and versatile cylinders are effecting considerable savings throughout industry by the reduction or complete elimination of costly mechanisms involving cams, gear drives and complicated set-ups.

Don't forget—with slight modifica-

tions, any size or model of Lindberg Air Cylinder may be used for low pressure hydraulic applications.

WRITE FOR NEW BULLETIN 731—this 16 page catalog just off the press gives details of all standard Lindberg Air Cylinder models and sizes with complete tables on bores, pressures, weights, mountings and conversion to low pressure hydraulics.

Remember—BULLETIN 731 for COMPLETE DETAILS ON AIR CYLINDERS

## **LINDBERG**

### **AIR & HYDRAULIC CYLINDERS**

Lindberg Engineering Company  
2442 West Hubbard Street Chicago 12, Illinois

### **Specify Lindberg**

when you need **HYDRAULIC CYLINDERS**  
**OIL HYDRAULIC PUMPING UNITS**  
**MILL TYPE CYLINDERS • CENTRIFUGAL**  
**BLOWERS • AIR VALVES**



MTBB  
JULY, 1950

## *News of the Industry*

### **Norton Grinding Machine Division 50 Years Old**

This year marks the fiftieth anniversary of Norton Company's Grinding Machine Division.

Upon incorporation, the grinding machine business was named "Norton Grinding Company" (an independent enterprise whose parent was the then Norton Emery Wheel Company) and was established to manufacture the first production-precision cylindrical grinding machine in the United States.

Works began fifty years ago this spring on "Norton Plain Machines for Cylindrical Grinding." The first machine was sold to R. H. Hoe and Company of New York for grinding printing press rolls.

The Norton Emery Wheel Company's name was changed to Norton Company in 1906 when manufactured abrasives replaced natural emery and corundum

in the manufacture of grinding wheels. The name Norton Grinding Company, however, remained as such until 1919, when it was merged with Norton Company, becoming the Grinding Machine Division as it is now known.

The most important factor in the decision to manufacture grinding machinery was Charles H. Norton (no relation of Franklin B. Norton of grinding wheel and pottery fame). Mr. Norton was a machine designer with plans for the first production cylindrical grinding machine. His plans went one step further with the use of the grinding wheel as a polishing tool, which was prevalent in those days. He conceived the idea that grinding could remove greater amounts of stock, and in many instances supplement the lathe as an actual production tool.

As a result, he and his associates

Fig. 1. Norton 10" cylindrical grinder, type CTU, the modern counterpart of the first Norton cylindrical grinding machine.

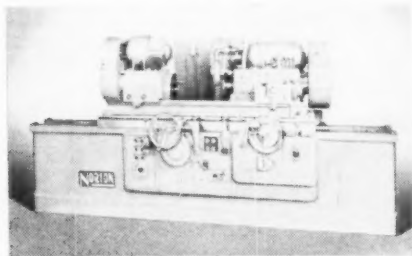
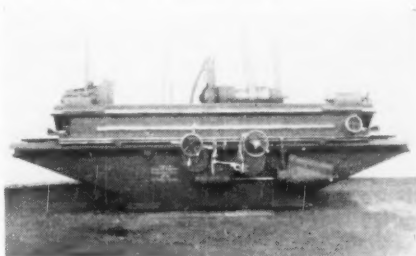


Fig. 2. First Norton production cylindrical grinding machine. It was designed by Charles H. Norton and built in 1900 for grinding printing press rolls.





**Charles H. Norton,**  
Father of Cylindrical Grinding

• • •

were responsible for many developments pioneered by the Norton Grinding Company in the early years of this century including crankshaft and camshaft grinders, roll grinders, flat surface grinding machines, fully automatic cylindrical grinding machines, and machines for lapping—to mention a few. In all, over 41,000 grinding machines have been turned out by the company since 1900.

Charles H. Norton was awarded the John Scott medal in 1925 for his many accomplishments in the field of grinding, perhaps best demonstrated by the more than 100 patents held in his own name. He retired in 1925 and died at the age of 91 at his Plainville, Connecticut, home in 1942.

### **Industrial Furnace Manufacturers Elect New Officers**

At their annual meeting May 15 at Hot Springs, Virginia, the Industrial Furnace Manufacturers Association elected Henry M. Heyn, of Surface Combustion Corporation, to serve as president for the current year.

Mr. Heyn, who is sales manager of the Heat Treat Division of Surface Combustion, has been active in IFMA for many years, serving on numerous committees. He has been particularly active in the industrial mobilization work of the Association.



**Henry M. Heyn,**  
President of IFMA

• • •

### **Swedish Gage Subsidiary to Distribute Jo-Blocks**

The C. E. Johansson Gage Co., a division of Swedish Gage Co., 8900 Alpine Ave., Detroit 4, Mich., has been appointed as the distributor for United States and Canada, of Johansson Gage Blocks and Accessories and other products manufactured by the Aktiebolaget C. E. Johansson Co., Eskilstuna, Sweden. Aktiebolaget C. E. Johansson is the manufacturing plant in Sweden established by Mr. C. E. Johansson the inventor of the combination gage block system, known the world over as the "Jo Block". Mr. Johansson developed the Johansson Gage Blocks in his home work shop in Eskilstuna, Sweden and from that city has proceeded to supply gage blocks to all of Europe.

The C. E. Johansson Gage Co., announces that these gage blocks and accessories will now be available on the American market, at prevailing prices. These items will be carried in stock by the C. E. Johansson Gage Co., and inspection and reconditioning service will also be available.

### **Walter Guy Robbins: 1901-1950**

Walter Guy Robbins, president of the Carboly Co., Inc., Detroit, died Thursday, May 18th, of a heart attack while on a business trip in Schenectady, N. Y.



Walter Guy Robbins

Mr. Robbins was born in Neodesha, Kan., Sept. 25th, 1901.

His first job out of college was for American Telephone & Telegraph of Southern California. In 1926 he joined the Stoddy Company in California as

a design engineer. When his company bought some cemented tungsten carbide from Krupp A. G. in Germany, Robbins was sent to Detroit to sell it.

His success in doing so led to his being hired by the newly formed Carboly Co., a General Electric subsidiary, as District Manager, on January 1st, 1929. In 1930 he was made General Manager and then Vice-President of the company and in 1936 was elected President, a position he has held continuously since that time.

In 1936 he became convinced of the approach of war and sold the General Electric Company on greatly expanding Carboly's manufacturing facilities, even though the eight year old Carboly Company was still in the red.

In addition to his membership on various Industrial Advisory Committees during the war, Robbins was one of the founders and later President and Chairman of the Cutting Tool Manufacturers' Association, an organization of which he was a director at the time of his death.

## THIS QUIZ WILL BE A GRIND

By Herman Reichardt, Consulting Engineer

Count ten for each correct answer. You should get above 80. Seven correct answers will pass, but below 70 will send you back to the apprentice school for a little brush-up.

1. Wheels bonded with rubber are for **rough brass, fine finish,** or **dry grinding.**
2. Silica bonded wheels are used in **dry grinding, roughing, wet tool grinding.**
3. Grain sizes of grit 70 to 180 are used for **finish, coarse, or fine grinding.**
4. A hard grade wheel is determined by the **pressure under which it is made, hardness of bonding, heat under which baked.**
5. Finest finishes are secured by **slow speed, coarse wheels, high speed fine wheels, wheels which are worn smooth.**
6. Shellac bonded wheels are best for **grinding excessive stock, coarse grinding, high finish.**
7. Resinoid bonded wheels are intended for working at **6,000, 7,500, 9,250 surface feet per minute.**
8. Work should be forced against an old wheel, it makes no difference, **should not be forced.**
9. Wheel for wet grinding is not damaged by partly being immersed over night in water, hardens the bond, no portion of the wheel should stand in water.
10. Wet grinding wheels should be dressed at high speed, same speed as work, very slow speed.

Answers to quiz on page 270.

## Aro Equipment Corp. Shows Products to Wall Street

Main Street, U.S.A. moved into Wall Street today to give the financial community a two-day showing of how the other half of the American enterprise system does its job.

Opening what he terms a "one-company product exposition" on the main banking floor at 37 Wall Street, Ralph W. Morrison, vice-president of The Aro Equipment Corp., of Bryan, O, told an invited group of writers and other guests that this would be a "good way for industry and finance to get closer together."

Aro manufactures lubricating equipment, grease fittings, pneumatic tools, hydraulic pumps and a variety of aircraft operational equipment, many of which have been set up in their actual forms at the "exposition" with crews to demonstrate them in action.

"We brought this miniature industrial exposition to New York," Morrison said, "to show how the skills of

our people, in a little mid-western community, contribute to science, industry, transportation and the everyday well-being and enjoyment of millions of other people everywhere, and help to strengthen our own nation in a war-weakened world."

## Tap Sharpening Service

The Edward Blake Co., 437 Cherry Street, West Newton, Mass. believes there is a lot more life in most taps than is usually obtained, and in many instances there is even greater precision.

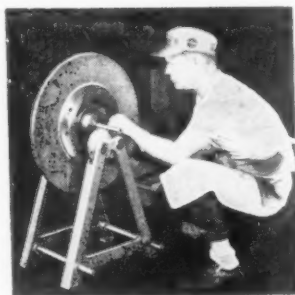
To enable those who have never investigated and realized the benefits to be had from properly sharpened taps, and also to provide a place where the small firm who cannot afford to buy tap sharpening equipment can obtain the same service that larger firms can get, they have established a tap servicing department. They stress the fact that this department is not a salvage department to make good taps out of junk; but customers can get far greater

## Use *Anderson* BALANCING WAYS No Leveling Required

With Anderson Balancing Ways it is easy to balance any rotating object in a fraction of the time formerly required by other methods. Simply place the Ways on the floor or bench and they are ready to use without adjustments of any kind.

The revolving, chilled iron discs and the spindles are ground and balanced to extreme accuracy. Spindle bushings are hardened — glass hard — yet without danger of breaking. This eliminates the possibility of wear or ball bearing indentations on spindles or bushings when heavy weights are placed on ways. They save time, save labor, and assure better work.

Write for Bulletin No. 7-5.



Swing	Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

## ANDERSON BROS. MFG. CO., Rockford, Ill.

Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses.



value from their taps if they keep them sharp, and a correctly sharpened tap gives the greatest accuracy because it has accurately indexed cutting edges, uniform and correct rake angle for the cutting teeth, and uniformly relieved chamfers.

Accuracy of pitch diameters is generally found in all ground thread taps, but very little has been done in controlling the rake angle of the cutting teeth. With their equipment these points are all controlled.

Taps for sharpening are sent direct to Blake Co., at West Newton, and returned promptly by mail or express to the customer.

### **Automatic Steel Products Acquires Cleveland Tapping**

A. M. Wickwire, president of Automatic Steel Products, Inc. of Canton, O. announced today that the corporation has taken over the active management of The Cleveland Tapping Machine Co. of Hartville, O. and will continue its operation under that name.

A. R. Wise has been appointed a vice-president of Cleveland Tapping and will be in charge of sales. In the machine tool field the company is well known as a manufacturer of high production vertical and horizontal tapping machines with multiple, stationary, and movable heads and feeding and holding devices for work of any size or shape. Under an expansion policy the new management will not only continue production of the established Cleveland line but also develop new markets and machines. Other Automatic Steel products include spunsteel pulleys, mercury-actuated clutches, automotive pumps, jacks, and lifts, and grinding wheels.

Bay State Abrasive Products Company's Board of Directors, L. M. Krull, (Chairman), O. S. Buckner and E. C. Hughes on May 23rd voted an appropriation to total \$250,000.00 for additional factory buildings and equipment in order to cope with the Westboro, Mass. concern's increased business

**MODEL  
B-3  
WITH  
BALL-BEARING  
HOLD DOWN.**



**3005 W. 111th STREET**

**Beverly THROATLESS SHEAR**  
*Cut any Shape...* **STRAIGHT OR  
IRREGULAR**

You can make straight or intricate cuts in the lightest metals without distortion, yet handle heavier gauges with ease on a Beverly — "the Shear that experience built and performance made." Smooth, powerful, clean-cutting action of the Beverly have made it the preferred shear wherever metal is cut. Ask your Dealer to show you these superior metal cutting tools . . . or write for more details and illustrated circular.

Made in 4 sizes to handle 18 ga., 14 ga., 10 ga., and 3/16" mild steel. H.C.H.C. blades available for cutting stainless steel.

**BEVERLY SHEAR MFG. CO.**  
**CHICAGO 43, ILLINOIS**

volume. The work will start immediately.

A large percentage of the recent increased sales is due particularly to new abrasive developments that Bay State has introduced to the industrial markets throughout the world within the past year. This is the second major physical expansion that Bay State has made within the last year. A similar amount was invested during 1949 (approximately one quarter million dollars). The new buildings and equipment were put into immediate operation and are currently operating to full capacity.



Fay Henry Willey

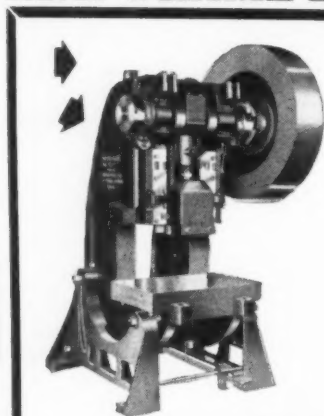
### Fay Henry Willey: 1896-1950

Mr. Henry Fay Willey, founder and president of Willey's Carbide Tool Co., Detroit, died on May 6, 1950 at the age of 53. Mr. Willey was born in Weston, W. Va. He was one of the pioneers in the development of the tungsten carbide industry and was also well known

in the industrial diamond business. As president of Willey's Carbide Tool Co. he earned for that company and its products an enviable place in the cutting tool industry.

De Witt Equipment Co., affiliated with Dewitt Tool Co., have opened a new store at 136 Lafayette St., New

## NEW FRAME DESIGN★ IN



**PRESS-RITE**  
85 TON

**POWER PRESS**

**PROVIDES GREATER STRENGTH**

★TWO TIE RODS of high tensil steel, reinforce the one piece special alloy gap frame and provide extra strength, rigidity and extra insured tonnage at no EXTRA COST.

TIE RODS are heated and shrunk in place providing this 85 ton machine with a pre-loaded frame.

INVESTIGATE this revolutionary frame design and the entire Press-Rite Power Press line today.

**SEE YOUR DEALER OR WRITE FOR DETAILS!**

*Sales Service Machine Tool Co.*



PRESS  
RITE  
PRESSES



SHAPE  
RITE  
SHAPERS



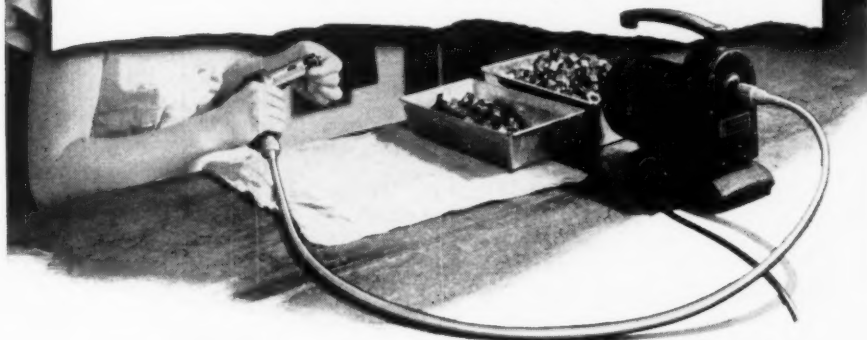
ROLLER  
POWER  
HACK SAW

2363 UNIVERSITY AVENUE  
ST. PAUL 4, MINNESOTA

## S. S. White Flexible Shafts are chosen because

...they provide an extremely convenient means of transmitting the power from the motor, located in the base unit, to the gaging member. The shafts themselves have performed with consistent effectiveness and with a minimum of annoying vibration.

Taft-Peirce Mfg. Co., Woonsocket, R. I.



In the Taft-Peirce Power Thread Gage, shown above, an S.S. White Flexible shaft drive helps put thread inspection on a profitable production line basis. The shaft not only permits the use of a light-weight, easily handled handpiece, but it also gives the operator full freedom in swinging the gaging device from bin to bin or over large areas.

Highly maneuverable, smooth operating, long lasting — S.S. White flexible shafts can increase the efficiency and utility of many types of portable tools. The cooperation of S.S. White engineers is always available in working out the details of any application.



**WRITE FOR BULLETIN 4501**

*It gives essential facts and data about flexible shaft selection and application*



# S.S. WHITE

THE S. S. WHITE DENTAL MFG. CO.

# INDUSTRIAL

DIVISION

DEPT. H, 10 EAST 40th ST., NEW YORK 16, N. Y.

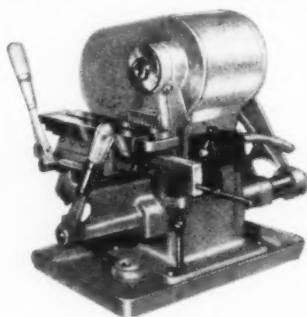


FLEXIBLE SHAFTS AND ACCESSORIES  
MOLDED PLASTICS PRODUCTS—MOLDED RESISTORS

*One of America's AAAA Industrial Enterprises*

**THIS BURKE  
BENCH MILLER**  
COSTS only

**\$240**  
(less motor)



It's the little Miller with the big reputation for accurate work. For production, tool rooms, schools, hobbyists. Send for catalogue of hand and power feed models.

**The BURKE MACHINE TOOL CO.**  
A Division of U. S. Burke Machine Tool Co.  
20 East 72nd St. Cincinnati 16, Ohio

# REID SURFACE GRINDERS

★  
THE PRECISION  
CHOICE OF WORLD-  
WIDE INDUSTRY

★  
1900 - 50th - 1950  
*Anniversary*

REID BROTHERS CO., INC.  
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York City, 13, with a full line of machine shop supplies.

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work releasing the clutch.  
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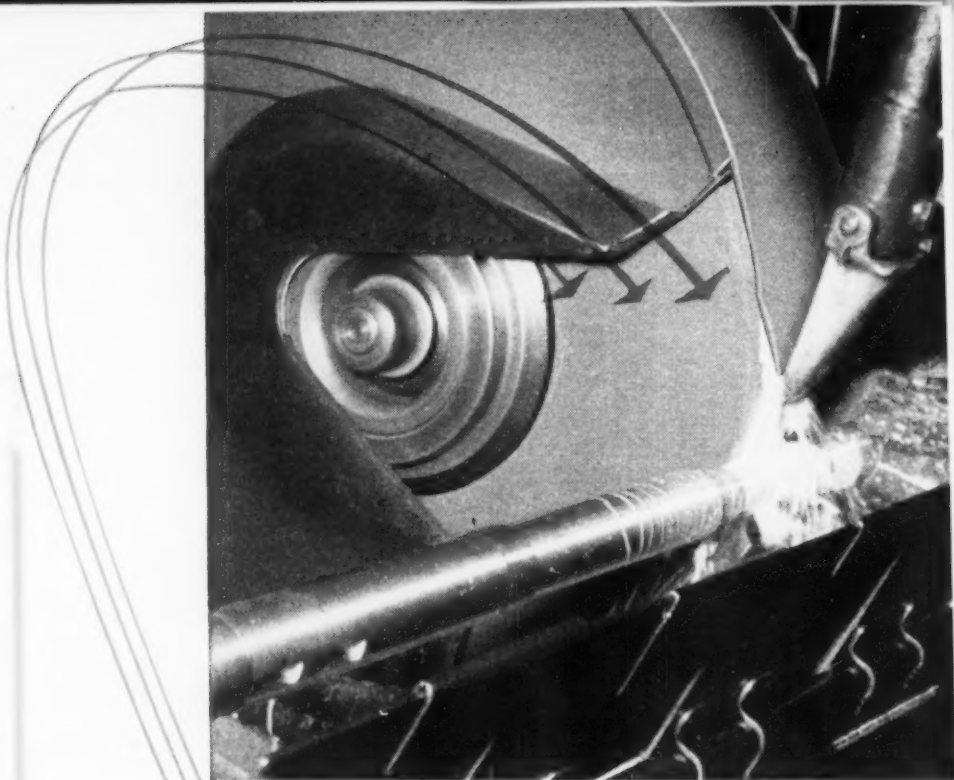
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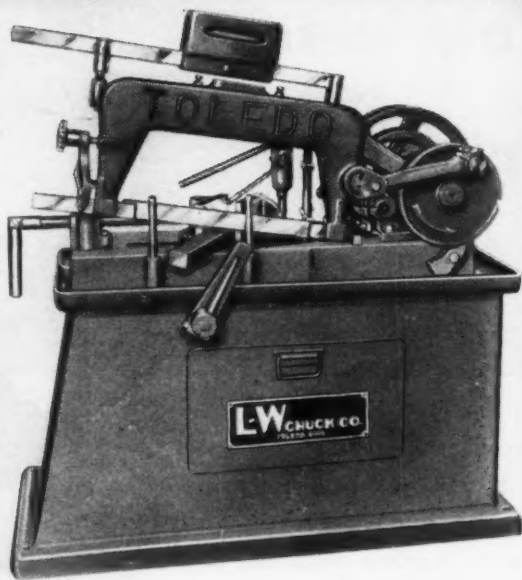
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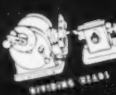
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A Special Report  
by the editors of  
Machine and Tool  
Blue Book

REPORT NUMBER 3

## Milling machines: knee type

This is the third of a series of special reports discussing particular types of machines. Included in this month's report on Knee-type Milling Machines are:

1. an article on the use of carbides in milling machine operations,
2. descriptions of late model milling machines,
3. series, models and specifications of American machines.

The two previous reports discussed Thread Rolling, Power Press Brakes.

### Part I — Some thoughts on the use of carbides in milling.

by Dr. M. Eugene Merchant  
Senior Research Physicist  
The Cincinnati Milling Machine Co.

Of all the advances made in the last ten years in the art of milling, none has been so spectacular as the use of carbides. When it is remembered that carbide milling of steel was not made practical until 1942 and 1943, the progress made since then can be appreciated. In view of recent developments, and in spite of the millions of words written and spoken on the subject, it might not be redundant to reemphasize some of the more fundamental aspects of carbide milling. There are still plants in this country whose conversion to carbides, where their use is indicated, has been slow and hesitant.

One of the reasons shops are reluctant to embark on a full scale carbide program is their sad experience with a few applications. The use of carbides requires supervision and attention. They cannot be handled in a hit-or-miss fashion and their application is not a mere matter of going to the crib, picking out a tool and tossing it into the machine. A sound tool control program is essential for the change-over from high speed steel to carbides and should be under the supervision of a specialist.

#### Planning a Program

A carbide conversion program should consist of five important aspects: 1. supervision over the entire carbide program by a specialist; 2. preparation of the tools, selection of cutter, brazing and sharpening of the tools, and handling of cutters; 3. mounting of the

# CARBIDE CUTTER WORK RECORD

DATE

TIME

TYPE OF CUTTER

DIA.

TEETH

ADJ.

RANGE

RADIAL

RANGE

TANG.

RANGE

WORK

REL.

LAD.

REL.

LAD.

REL.

TURNER

ANGLE

CUTTER

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CARBIDE CUTTER CARD										
Serial No.			Tool No.							
Cutter Type			Teeth				Make			
Diameter			Hand				Bore			
Cutter Angle			Axial Rake				Radial Rake			
Bob Thickness			Body Mat'l				Tip Size			
Location of each file										
Lead										
Flute Face Angle										
Face										
Flute										
Flute End										
Flute										
Flute End										
Tip										
Root										
Grinding Time (Min.)										
Date Ground										
Count	1	2	3	4	5	6	7	8	9	10

The comparative cost of carbides over high speed steel makes it imperative that proper care be taken of the sharpening operation, handling, and brazing of carbide to the tool shank.

### Cutter Life

Considerable research has been conducted into the relationships of power, finish, tool life to cutting speed, feed per tooth, tooth angles, etc. These studies have revealed some interesting data. At one time it was believed that high cutting speeds and low feeds resulted in longer cutter life; however, these suppositions have been replaced and it is now preferred practice to use somewhat lower cutting speeds and higher feeds per tooth. Studies have shown that cutter life increases rapidly as the cutting speed is decreased. However, too low a speed must be guarded against as the work surface may become unsatisfactory. In addition, at very low speeds, cutter life again grows poor. On the other hand, cutter life (in terms of metal removal) increases as feed per tooth is increased, up to a certain point. But at very heavy feeds, cutter life again drops off.

Assuming a cutting speed to be constant, a longer tool life is obtained when cutting softer metals than when cutting harder metals; use low cutting speeds for hard metals and higher cutting speeds for soft metals.

## Carbide Feeds and Speeds

It is important never to start a job without first determining the hardness of the material. A carbide might fail instantly when a high cutting speed is used on a hard material. Best practice is, of course, to begin at a recommended starting cutting speed and then adjust the speed upwards, depending on whether the cutter sparks prematurely. Chart 2 lists recommended starting values of cutting speed for a variety of

Work Material	Cutting Speed Ft. Min.
Alloy Steel—Hard Cast Steel (300-400 Brinell)	90-150
Alloy Steel—Tough Cast Steel (220-300 Brinell)	150-225
Alloy Steel—Annealed Cast Steel (180-220 Brinell)	225-325
Low Carbon Steel—Malleable Iron (152-197 Brinell)	270-400
Low Carbon Steel—Free Machining (150-180 Brinell)	325-400
Cast Iron—Hard (220-300 Brinell)	150-225
Cast Iron—Medium (180-220 Brinell)	225-325
Cast Iron—Soft (150-180 Brinell)	325-400
Brasses and Bronzes—Hard (150-250 Brinell)	190-400
Brasses and Bronzes—Medium (100-150 Brinell)	400-600
Brasses and Bronzes—Free Cutting (180-100 Brinell)	600-1000
Magnesium and Alloys	Unlimited
Aluminum and Alloys	Unlimited
Plastics	Unlimited

Chart 2. Recommended starting values of cutting speed.

Work Material	Feed Per Tooth					
	Face Mills	Helical Mills	Slotting and Side Mills	End Mills	Form Cutters	Saws
Alloy Steel—Hard Cast Steel (300-400 Brinell)	.010	.008	.006	.005	.003	.003
Alloy Steel—Tough Cast Steel (220-300 Brinell)	.012	.010	.007	.006	.004	.003
Alloy Steel—Annealed Cast Steel (180-220 Brinell)	.014	.011	.008	.007	.004	.004
Low Carbon Steel—Malleable Iron (152-197 Brinell)	.014	.011	.008	.007	.004	.004
Low Carbon Steel—Free Machining (150-180 Brinell)	.016	.013	.009	.008	.005	.004
Cast Iron—Hard (220-300 Brinell)	.012	.010	.007	.006	.004	.003
Cast Iron—Medium (180-220 Brinell)	.016	.013	.010	.008	.005	.004
Cast Iron—Soft (150-180 Brinell)	.020	.016	.012	.010	.006	.005
Brasses and Bronzes—Hard (150-250 Brinell)	.010	.008	.006	.005	.003	.003
Brasses and Bronzes—Medium (100-150 Brinell)	.012	.010	.007	.006	.004	.003
Brasses and Bronzes—Free Cutting (180-100 Brinell)	.020	.016	.012	.010	.006	.005
Magnesium and Alloys	.020	.016	.012	.010	.006	.005
Aluminum and Alloys	.020	.016	.012	.010	.006	.005
Plastics	.015	.012	.009	.007	.005	.004

Chart 3. Recommended starting values of feed per tooth.

work materials. These cutting speeds should be reduced by one-third when milling forgings or steel castings where hard inclusions are likely to be encountered with adverse effect on cutter life.

Several considerations must be accorded the selection of feeds. The power of the machine, number of teeth in the cutter, rigidity of the cutter, work and fixture, and the finish required all have an important bearing on feed selection. Chart 3 lists the recommended starting values of feed per tooth for a variety of work materials.

The power required for carbide milling is expressed in cubic inches of metal removed per minute per horsepower. The higher the feed per tooth, the greater the volume of metal that can be removed per minute for a given

horsepower. This is another reason for using higher feeds per tooth.

Carbide milling usually requires more power than milling with high speed steel because more metal is usually being removed in a given time. Chart 4 shows the power required to mill steel of various hardnesses.

When selecting the feed per tooth from chart 3, it must be remembered that the maximum thickness of the undeformed chip may be only 10% to 50% of the feed per tooth when slotting shallow cuts. On such cuts the upper limit of feed is recommended; further, the higher feeds per tooth are constantly urged for increased tool life.

### Rake Angles for Steel

The true rake angle is a function of the axial rake, radial rake, and corner angles. Figure 1 illustrates and defines the true rake and the angle of inclination. A negative true rake is desirable for long tool life in the milling of steel; further, from the standpoint of chip flow, the cutter teeth should have a positive inclination.

Direction of the chip flow is very important and has considerable bearing on designs of carbide-tipped face mills. The direction of the chip flow is determined by the angle of inclination of the cutting edge with respect to the tooth path. Negative inclination directs chips into the cutter body; positive inclination directs chips away from the cutter body and is consequently more desirable. Smaller chip clearance is needed in the cutter body with a high positive inclination. The value of the inclination can be obtained from chart

Chart 4. Power required to mill steel of various hardnesses.

$K$  = cu. in. metal removed per min./per h.p. for steel

Brinell Hardness Number	$K$ (Dull Cutters)
100	.80
150	.70
200	.65
250	.60
300	.55
400	.50

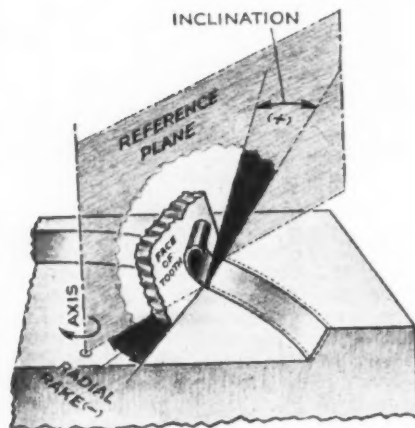
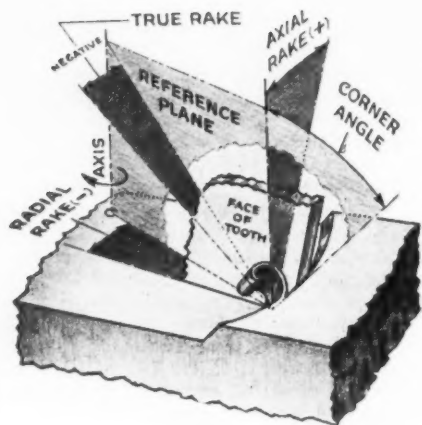


Fig. 1. Illustrating the elements of face milling cutter teeth including the true rake and the angle of inclination.

5. The conventional combination of negative axial and radial rakes have been superseded by the trend toward the use of positive axial rakes in combination with negative radial rakes and large corner angles.

The use of large corner angles makes possible high feeds per tooth and high feed rates, at the same time maintaining low chip thickness.

These large corner angles provide

long tool life per tooth because the depth of cut is distributed over a longer cutting edge; further, by the gradual entry of the tooth into the cut, impact is held to a low and favorable level, see figure 2.

For general purpose milling of steel, face mills should have a negative true rake, a positive inclination, and a corner angle of at least  $45^\circ$ . As hardness of the steel increases, the amount of negative true rake should increase. Chart 6 shows recommended rake angles for face milling, slab milling, slotting, and sawing.

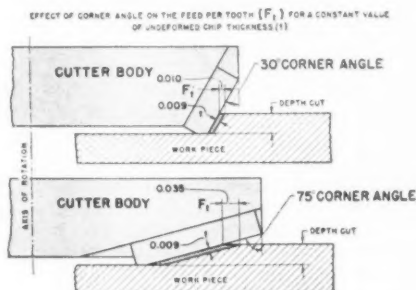
Should severe cutting conditions occur, true rakes as high as minus  $25^\circ$  can be used.

If operating conditions permit the use of high feed rates, corner angles as high as  $75^\circ$  may be used.

Charts 7 and 8 list the primary clearance angles and recommended face angles for carbide face mills.

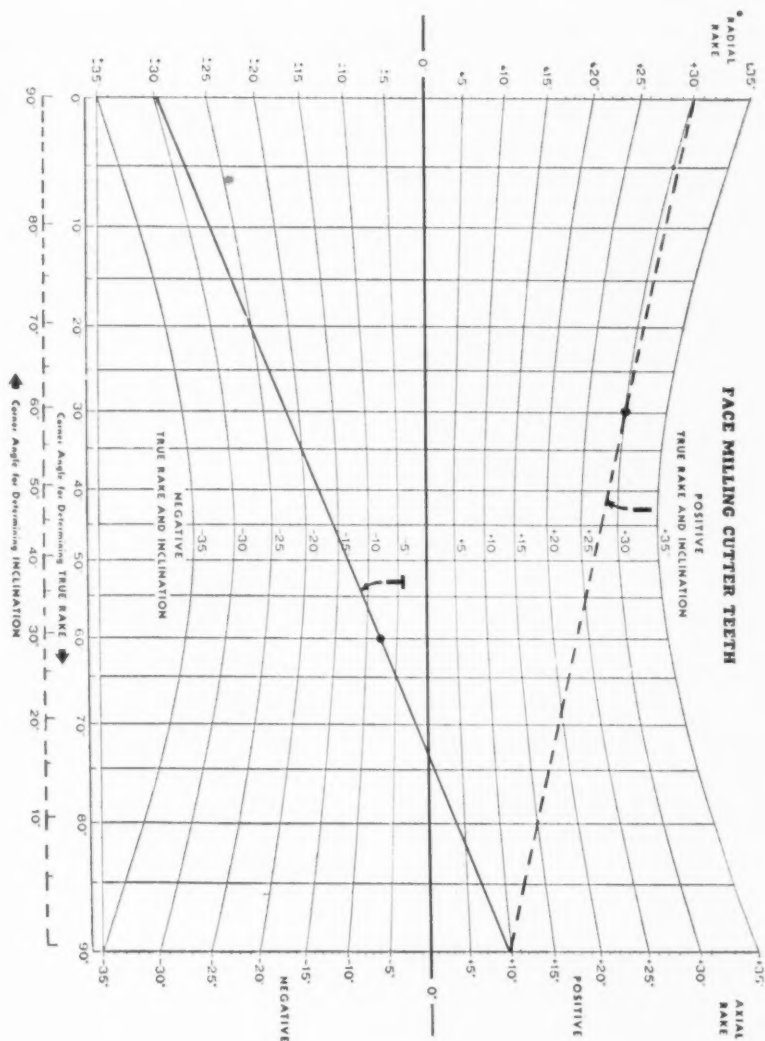
A very important consideration in carrying out face milling operations on steel, with carbide cutters, is the position of the cutter relative to the work. If the cutter is set so far over the work that each tooth enters the cut at a sharp angle, the cutter will fail almost immediately. This is shown in Chart 8a. In order to prevent this condition the cutter should overhang the edge of the work by an amount equal to at least one-third of its diameter.

Fig. 2. Greater feed per tooth can be secured without increasing chip thickness by increasing the corner angle.





Use Solid line for determining TRUE RAKE  
Use Dotted line for determining INCLINATION




Slab Milling	Low Carbon and Annealed Alloy Steels	Axial Rake	Radial Rake	True Rake
		+5°	-5°	-5°
	Hardened Alloy Steels	+10°	-10°	-10°
Slotting and Sawing	Low Carbon and Annealed Alloy Steels	0	-5°	-5°
	Hardened Alloy Steels	0	-10°	-10°

Face Milling	Low Carbon and Annealed Alloy Steels	Axial Rake	Radial Rake	Corner	True Rake	Inclination
		+5°	-12°	45°	-5°	+12°
	Hardened Alloy Steels	+5°	-18°	45°	-10°	+16°
	Cast Iron	+15°	-30°	75°	+6°	+32°

Chart 6. Recommended rake angles for face milling, slab milling, slotting, and sawing.

FOR CARBIDE MILLING CUTTERS



Type of Cutter	Primary Clearance Angles								
	Periphery			Corner			Face		
	Steel	C. I.	Al.	Steel	C. I.	Al.	Steel	C. I.	Al.
Face or end...	4-5°	7°	10°	4-5°	7°	10°	3-4°	5°	10°
Slotting...	5-6°	7°	10°	5-6°	7°	10°	3°	5°	10°
Sawing...	5-6°	7°	10°	5-6°	7°	10°	3°	5°	10°

Chart 7. Primary clearance angles.

## Milling Cast Iron with Carbides

While the structure of steel is clearly indicated by the type, heat treatment and resulting hardness, the metallurgical structure of a piece of cast iron is not as easily determined. Great metallurgical variations may occur between one piece and another; consequently, differences in tool life may be as much as 100 to 1 between one type of cast iron and another. In fact, it is not unusual to find differences in tool life when machining various sections of the same casting.

It has been found that the cutter life, when milling cast iron, depends on the micro-structure rather than on the hardness. However, for average grades of cast iron with a Brinell hardness range of 150 to 220, recommended starting values of cutting speed range from

350 to 250 ft. per min., depending on the uniformity of the material. This cutting speed may in some cases have to be reduced to about 200 feet per minute for satisfactory cutter life. Chart 9 lists various cast irons in order of decreasing tool life.

For all types of cutters, except thin saws, use a starting value of feed per tooth of .008" to .020"; wherever possible, favor the high limit. For thin saws, the feed per tooth may have to be as low as .003", depending upon the depth of cut and proportions of the saw.

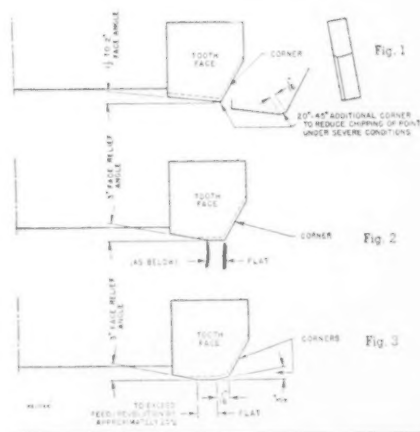
Axial and radial rake angles now used for milling cast iron vary over a considerable range. So as to obtain a desirable value of true rake, it is important that the combination of rake angles be selected with respect to the corner angle.

The alignment chart 5 will give values of true rakes for any combination of axial rake, radial rake, and corner angles. For average conditions, the

• • •

Chart 8. Recommended face angles.

Finish Desired	Face Angle	Fig. No.
For roughing operations	15° to 25°	1
Flat to exceed lead revolution by approximately 25%		2
For good finish		
For good work finish where chatter is accelerated	15° x 15° Additional Corner with flat to exceed lead revolution by approximately 25%	3



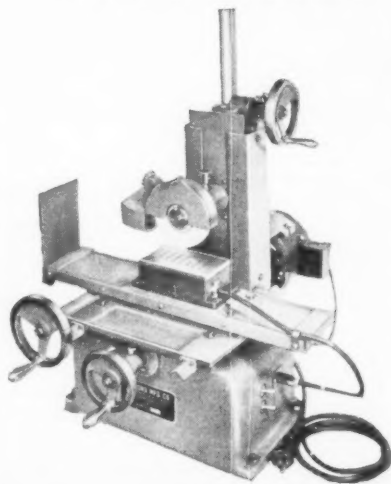
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true rake should vary from  $+4^\circ$  to  $+10^\circ$ . Corner angles in general use vary from  $30^\circ$  to  $45^\circ$ . A recent development in carbide milling of cast iron utilizes a cutter with a corner angle of  $60^\circ$  to  $75^\circ$ . The lower figure is preferred when milling pieces covered with particularly abrasive scale. This type of cutter has a high positive axial rake and a high negative radial rake so that the true rake is slightly positive. A high feed rate is possible with this type of cutter and break-out of the workpiece at the edge where the cutter leaves the work is minimized. One combination of angles which has proved satisfactory in the field utilizes the following angles:

Axial rake  $+15^\circ$  Corner angle  $60^\circ$   
 Radial rake  $-20^\circ$  True rake  $+3^\circ$   
 Inclination  $+23^\circ$

### Analyzing Carbide Milling Costs

When all is said and done, cost determines whether high speed steel or carbide cutters are to be used. The economies, under today's conditions, have become an important determining factor, and there is a wide variety of operations which can be performed with carbide cutters. These operations include: 1. face milling; 2. side or straddle milling; 3. narrow slab milling or angular milling; 4. shallow slotting operations—long or short; 5. sawing off or plunge cutting; and 6. profiling or tracing operations.

Determining the overall milling cost must take into consideration the milling operation, original cutter cost and cutter preparation cost. The factors entering into a consideration of the economy of milling are:

- C = total cost to mill one piece, dollars
- MLO = labor + overhead on milling machine, \$/min.
- GLO = labor + overhead on cutter grinder, \$/min.
- BLO = labor + overhead on brazing unit (assumed = GLO), \$/min.
- TM = total time to mill one piece, min.
- TO = feeding time + rapid traverse time + loading and unloading time
- TL = original set-up time on milling machine, min.
- NL = total number of pieces in lot
- TR = time to change and rest cutter, min.
- TS = time to change and reset cutter, min.
- NS = number of pieces milled per cutter sharpening
- TB = time to rebraze teeth (or reset blades), min.
- NB = number pieces milled per brazing (or resetting)
- CU = original cutter cost per workpiece
- CA = carbide (or blade) cost per workpiece
- W = wheel (diamond or abrasive) cost per sharpening

These factors can be combined into a single equation:

$$C = \underbrace{\left[ (MLO) \left( TM + \frac{TO}{NL} + \frac{TR}{NS} \right) \right]}_{\text{MILLING COST}} + \underbrace{[CU]}_{\text{INITIAL COST OF CUTTER}} + \underbrace{\left[ (GLO) \left( \frac{TS}{NS} + \frac{TB}{NB} \right) + CA + W \right]}_{\text{CUTTER PREPARATION COST}}$$

One of the most important facts shown by this equation is that the "milling cost" goes down as cutting speed (or feed per tooth) is raised, whereas the "cutter preparation cost"

goes up. As a result, there is for every job, an optimum cutting speed (and feed per tooth) for which C, the cost per piece, will be the lowest. This is the most economical speed (and feed)

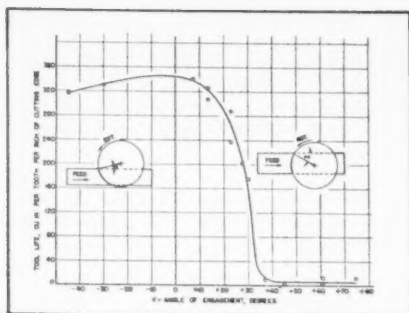


Chart 8a. Tool life, Cu. Ins., per tooth per in. cutting edge, versus angle of engagement. (Material: S.A.E. 1020, 130 Brinell; cutter: single tooth, 6" radius, —10 degrees axial and radial rake, 0, 15, and 30 degrees, corner angles; cut dimensions: 0.150" depth, 0.010" feed per tooth; width adjusted so that length of tooth path was 3.14").

to use for that job.

In summarizing, it must again be emphasized that conversion to carbide milling, or for that matter, to other machining operations as well, should be

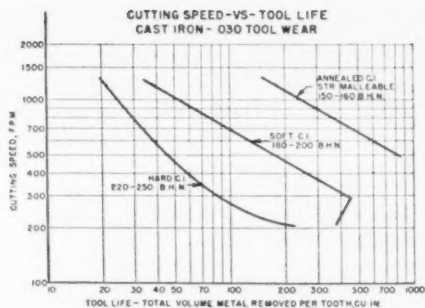
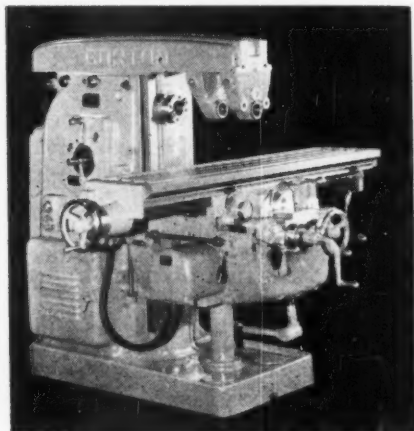


Chart 9.

undertaken as a program and not in a hit-or-miss fashion. Recommendations of carbide manufacturers and machine tool builders should be solicited. Where at all possible, as in the case of high production operations, the equation regarding cost of milling should be applied. This will determine the jobs on which carbide should be used; it will also determine which feeds and speeds are most economical. While the equation looks formidable, once actual figures are substituted for the symbols, it can be easily solved.

## Part 2 — Description of late model knee-type milling machines.



### The Gorton No. 2-28B Plain Type Mill

No. 2-28B, made by George Gorton Machine Co., Racine, Wis. has been designed for modern heavier milling cuts.

It is powered by a 10 h.p. motor. The gear train has only two gear shafts and two gears in driving contact at any speed.

The machine features a full width knee, securely mounted on the column by a square lock bearing on top of the knee; this bearing is nearly as wide as the saddle is long, assuring maximum rigidity under heavy cutting loads by providing support to the work piece, closely approaching that of a bed type machine.

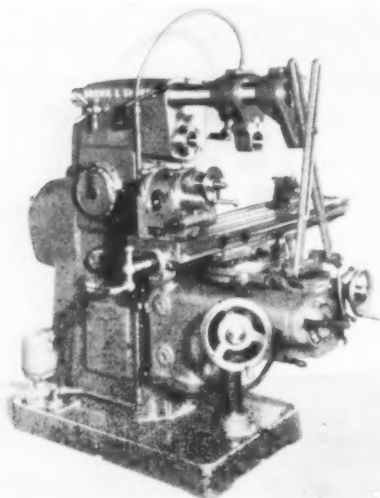
The column is a massive one-piece

structure combining maximum stiffness and rigidity. The spindle motor is enclosed in the column base, and mounted parallel to the spindle. The spindle is designed to provide both mass and weight of metal close to the spindle nose.

All controls are closely grouped at the front of the knee for operator convenience; all are full directional type. Each control is adjacent to its corresponding handwheel or crank. Live rapid traverse is provided—moving the table, saddle and knee in longitudinal, cross and vertical directions whether or not the spindle is running.

### **Brown & Sharpe No. 2 Universal**

This miller was designed by Brown & Sharpe Mfg. Co., Providence, R. I. for heavy cuts. It is powered by three driving motors: 5 h.p. for the spindle,  $\frac{3}{4}$  h.p. for feed and fast travel, and  $\frac{1}{4}$  h.p. for the coolant pump, a total of 6 h.p. Spindle is alloy steel and has a standardized end, hardened and ground. An extended spindle face gives greater rigidity of cutter support and permits use of smaller arbors and consequently smaller cutters, thereby reducing cutter costs and frequently permits faster feeds for equal surface finish through use of smaller diameter cutters with attendant shorter run-in.

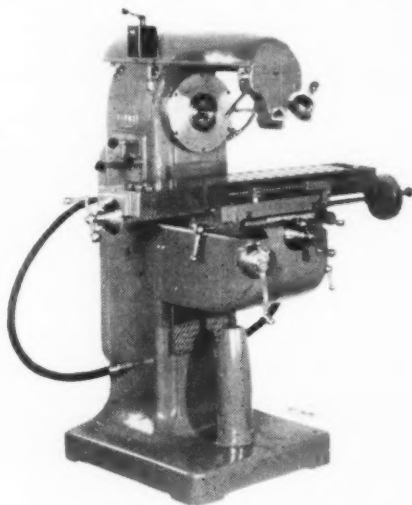


Automatic lubrication is provided for all driving mechanisms throughout column, knee and table. Fast travel is provided for longitudinal, transverse and vertical table movements in either direction. Rate, 75" per minute (with 60 cycle motor).

Double overarm for arbor support is solid steel and clamped rigidly at two points by single lever from front of machine.

### **Index No. 1 model 60**

This Plain Horizontal Miller of the Index Machine Co., 540 N. Mechanic St., Jackson, Mich. is of rugged construction and is a simple and a very efficient machine. Compact, and with



all operating parts enclosed, yet readily accessible, it has been designed with the needs of the average tool room in mind. It can also be used to meet the requirements of production shops. Two optional table lengths are available: 32" x 9" or 38" x 9"; including slotted end plates, 40" x 9" or 46" x 9".

Spindle is of heat treated and fully ground special alloy steel, with No. 40 Milling Machine Standard Taper hole. Hole through spindle is  $\frac{41}{64}$ ". Eight speed changes from 50 to 1000 r.p.m. are available. Shift levers (for speeds)

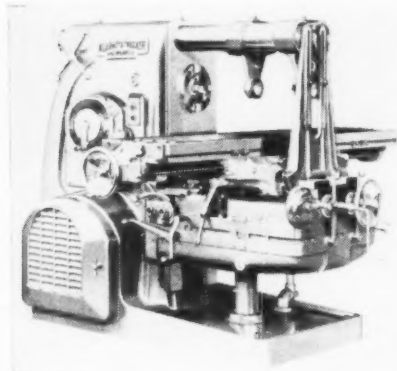


mechanically inter-locked preventing locking of gears.

Spindle, table feed, and coolant pump are driven by one 2 h.p. motor.

### **Kearney & Trecker 25 h.p. Plain, Universal**

The new Nos. 4, 5, 6, model CK Milling Machines made by the Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee, Wis., have 25 h.p. for spindle drive and 3 to 5 h.p. for feed and rapid traverse. Added momentum of a spindle-mounted flywheel assures longer cutter life, gives a smoother, more positive drive.



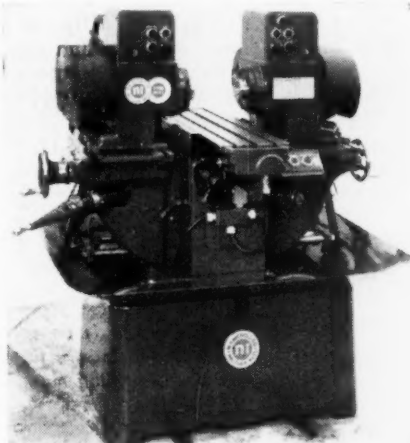
No. 60 Heavy Duty driving flange on Nos. 4, 5, and 6 machines permits use of heavy duty arbors with K & T flange drive for large size single or multiple cutter set-ups; or to bolt large face-milling cutters directly to spindle nose. Average set-ups use standard arbors for No. 50 spindle drive.

The CK has 24 spindle speeds, 15 to 1500 r.p.m. on Nos. 2 and 3; 13 to 1300 r.p.m. on Nos. 4, 5, and 6. Special automatic protectomesh shift eliminates gear clashing. Feed range extends to 32 changes from  $\frac{3}{8}$ " to 90" per minute with separate 3 or 5 h.p. feed and rapid traverse drive.

There is a smoother feed performance with a new design 2" diam. heavy-duty, table feed screw that affords greater bearing contact and runs through an extra-long table feed nut. Machines have a backlash eliminator for more effective climb milling.

### **The Nichols Twin Mill**

This machine is designed to handle a wide variety of light duty production milling operations. It machines two surfaces at once, yet requires but one workholding fixture and one set-up.



The two geared milling heads are completely independent units, each with its own vee belt motor drive and control. Main housing is of heavy, bowl-type, one-piece construction providing suitable lubricating oil reservoir for spindle and gear shafts. Each spindle is driven by a Pancake-type motor providing a selection of 15 spindle speeds in geometric progression. The Twin-Mill is made by Nichols-Morris Corp., 50 G Church St., N. Y. 7, N. Y.

The automatic table drive is pneumatic, solenoid-controlled, with suitable trips and limit switches to govern the table's movements. Cutting speed is infinitely variable, controlled and stabilized by a hydraulic cylinder with throttle valve which eliminates chatter and prevents the table from jumping when the cut is finished.

For special applications the machine may be furnished with tilted heads to handle milling of wedge-shaped work

### **Kempsmith LH Miller**

The No. 1, Horizontal model LH bridges the gap between low range

hand millers and big machines. It is made by Kempsmith Mach. Co., 1819 So. 71st St., Milwaukee, Wis. The LH has a range and power feed, powerful transmission, sturdy table support and rigid spindle mounting. The machine combines simple, sound construction with flexibility and versatility. It is ideal for small end milling, high speed jig boring, keywaying, oil grooving, light straddle milling, etc. The spindle is for National Standard Taper No. 40 with a hole-through diameter of 11/16". The speed is infinitely variable from 100 low range to 1800 r.p.m.

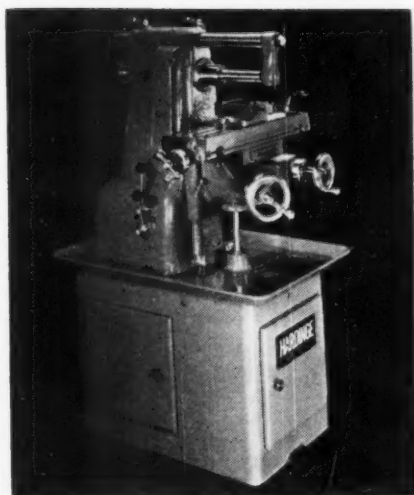
## Greaves No. 2-H

No. 2-H Plain and Universal Milling Machine made by the Greaves Machine Tool Co., Cincinnati 2, O., features 18 spindle speeds from 20 to 1000 r.p.m. Nine feeds are available 1/2" to 18" per minute. All speeds and feeds are transmitted through positive hardened lapped alloy steel gears, running in oil in dust tight sealed compartments. The heavy alloy steel spindle is mounted on oversize precision Timken bearings. A No. 50 National Standard spindle nose. Heavy rectangular overarm, self-oiling arbor support with reversible outer brace.

## Part 3 — Specifications of knee-type milling machines built in America.

NOTE: Due to lack of space it is impossible to list all manufacturers of milling machines in one issue. In the following months the BLUE BOOK will feature bench, hand, bed, duplicating, and special types of milling machines.

George Gorton Machine Co., Racine, Wis.					
Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L—Longitudinal V—Vertical C—Cross VH—Vertical Head
Plain No. 2-28					
Heavy Duty	7 1/2	12" x 56"	50 to 2000	1/4" to 60"	L=28" V=18 1/4" C=12"
Heavy Duty	7 1/2	12" x 56"	50 to 2000	1/4" to 40"	
Heavy Duty	7 1/2	12" x 56"	28 to 1100	1/4" to 60"	
Heavy Duty	7 1/2	12" x 56"	28 to 1100	1/4" to 40"	
Heavy Duty	5	12" x 56"	18 to 730	1/4" to 60"	
Heavy Duty	5	12" x 56"	18 to 730	1/4" to 40"	
Plain 3-34	10	14" x 62"	50 to 2000	1/4" to 60"	L=44" V=18 1/4" C=12"
3-34	10	14" x 62"	50 to 2000	1/4" to 40"	
3-34	7 1/2	14" x 62"	28 to 1100	1/4" to 60"	
3-34	7 1/2	14" x 62"	28 to 1100	1/4" to 40"	
3-34	5	14" x 62"	18 to 730	1/4" to 60"	
3-34	5	14" x 62"	18 to 730	1/4" to 40"	
Universal No. 2-28					
Heavy Duty	7 1/2	12" x 56"	50 to 2000	1/4" to 60"	L=28" V=18 1/4" C=12"
Heavy Duty	7 1/2	12" x 56"	50 to 2000	1/4" to 40"	
Heavy Duty	7 1/2	12" x 56"	28 to 1100	1/4" to 60"	
Heavy Duty	7 1/2	12" x 56"	28 to 1100	1/4" to 40"	
Heavy Duty	5	12" x 56"	18 to 730	1/4" to 60"	
Heavy Duty	5	12" x 56"	18 to 730	1/4" to 40"	
Universal 3-34	10	14" x 62"	50 to 2000	1/4" to 60"	L=44" V=18 1/4" C=12"
3-34	10	14" x 62"	50 to 2000	1/4" to 40"	
3-34	7 1/2	14" x 62"	28 to 1100	1/4" to 60"	
3-34	7 1/2	14" x 62"	28 to 1100	1/4" to 40"	
3-34	5	14" x 62"	18 to 730	1/4" to 60"	
3-34	5	14" x 62"	18 to 730	1/4" to 40"	



### Hardinge Model TM-UM

The precision milling machine was designed to meet a definite need in the tool room and laboratory. Construction combines ruggedness with extreme accuracy for ease of operation. TM model has a non-swiveling base for Universal Plain Index Centers while the Um model has a swiveling table for Universal Spiral Index Centers. It is made by Hardinge Bros. Inc., Elmira, New York.

Machine has eight spindle speeds from low of 110 to high to 1850 r.p.m. Enclosed column with "Connected Bearing" design has maximum rigidity for proper mounting of precision spindle bearings. Enclosed vee belt drive. Driving unit does not employ gears, clutches or loose pulleys. Knee section fully enclosed around vertical feed screw bevel gears to exclude dirt and chips. Precision ball bearing absorbs thrust on vertical feed screw.

### Kempsmith Machine Company 1819 So. 71st Street, Milwaukee 14, Wis.

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L = Longitudinal V = Vertical C = Cross VH = Vertical Head
Plain No. 1-H	2	33" x 9 1/4"	100 to 1800	1" to 10 1/4"	L = 15", V = 10", C = 9" Vert. Head Available
No. 1-G	3	42" x 10"	18 to 575	1/2" to 20"	L = 22", V = 19", C = 8" Vert. Head Available
Universal No. 1-G	3	42" x 10"	18 to 575	1/2" to 20"	L = 22", V = 18", C = 8" Vert. Head Available
Plain No. 2-G	3.5	45" x 10"	18 to 575	1/2" to 20"	L = 28", V = 19", C = 10" Vert. Head Available
Universal No. 2-G	3.5	45" x 10"	18 to 575	1/2" to 20"	L = 28", V = 18", C = 10" Vert. Head Available
Plain No. 3-G	5	57" x 11 1/2"	18 to 575	1/2" to 20"	L = 36", V = 19", C = 11" Vert. Head Available
Universal No. 3-G	5	57" x 11 1/2"	18 to 575	1/2" to 20"	L = 36", V = 19", C = 11" Vert. Head Available

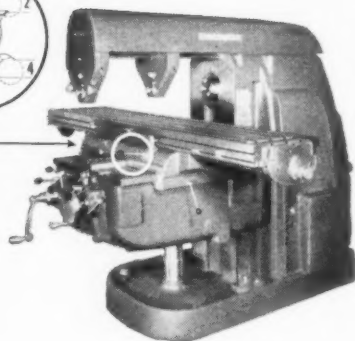
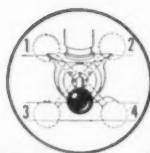
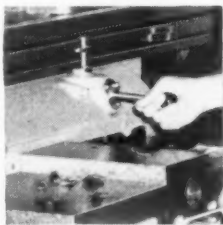
### Greaves Machine Tool Co., Cincinnati 2, Ohio

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L = Longitudinal V = Vertical C = Cross VH = Vertical Head
Plain No. 2-H	5	52 1/4" x 12"	20 to 1000	1/2" to 18"	L = 28", V = 19", C = 10"
Universal No. 2-H	5	52 1/4" x 12"	20 to 1000	1/2" to 18"	L = 28", V = 18", C = 13"

## Cincinnati Dual Power Dial Types

The Nos. 3, 4, 5 and 6 Dual Power Dial Types Milling Machines, made by the Cincinnati Milling Machine Co., Cincinnati 9, Ohio, are available in plain, universal and vertical type units. Featuring 24 spindle speeds in a 100:1 ratio, they offer a wide range of workability, using either h.s.s. or sintered carbide cutters; 32 feeds, in geometrical progression, 240:1 ratio, are provided, offering a large selection for either toolroom or production milling.

An outstanding feature of these units is the single lever control of the table (see illustration). The manual engagement of the table feed and rapid traverse is available through a single lever



in the plain and vertical machines, located on the front of the saddle at the operator's normal location. Five operating positions are provided, permitting the operator to feed or rapid traverse the table either to the right or to the left, or to stop the table at any desired location during the operation.

### Nichols-Morris Corp., 50 Church St., New York 7, N.Y.

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L - Longitudinal V - Vertical C - Cross VH - Vertical Head
Twin-Mill with Two Geared Milling Heads	1 2 motors	8" x 30"	15 Speeds Back-Geared, 55-590 Open Belt, 700-2050	0.60" Min. Infinitely Variable	L = 14 1/4", V = 11 1/4", VH = 9 1/4" Distance between spindle noses, 4" min. x 16" max. Transv. adjustment of each milling head, 6"

### Hardinge Brothers, Inc., Elmira, New York

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L - Longitudinal V - Vertical C - Cross VH - Vertical Head
Plain BB4-TM	1/4	12" x 3 1/2" 20 1/4" x 6 1/2"	180 to 4000 110 to 1850	Hand 1/4" to 13"	L = 8", V = 5", C = 3 1/4" L = 14", V = 13 1/4", C = 5 1/2"
Universal UM	1/4	20 1/4" x 6 1/2"	110 to 1850	1/4" to 13"	L = 14", V = 13 1/4", C = 5 1/2"
Vertical BB2V	1/4	12" x 3 1/2"	400 to 5000	Hand	L = 5", V = 5", C = 3 1/4"

**Sheldon Machine Co., Inc., 4242 N. Knox Ave., Chicago, Ill.**

Type Size and Model	H.P.	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L—Longitudinal V—Vertical C—Cross VH—Vertical Head
Plain No. 1-900P	1	125 to 1100 Infinite	Varies with Spindle RPM At 125 RPM: $\frac{3}{8}$ " $\frac{5}{8}$ " $1\frac{1}{4}$ " At 1100 RPM: $\frac{3}{4}$ " $5\frac{1}{2}$ " $8\frac{1}{4}$ "	L=12" V=9 $\frac{1}{4}$ " C=5 $\frac{1}{2}$ " VH=11 $\frac{1}{2}$ "
Plain No. 2-900PQ	1	25 to 1100 Infinite	Varies with Spindle RPM At 25 RPM: $1\frac{1}{5}$ " $2\frac{1}{5}$ " $4\frac{1}{5}$ " $1\frac{3}{5}$ " At 1100 RPM: $\frac{7}{8}$ " $1\frac{1}{4}$ " $3\frac{1}{4}$ " $7$ "	L=12" V=9 $\frac{1}{4}$ " C=5 $\frac{1}{2}$ " VH=11 $\frac{1}{2}$ "

**Index Machine & Tool Co. 543 N. Mechanic St., Jackson, Mich.**

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L—Longitudinal V—Vertical C—Cross VH—Vertical Head
Plain No. 1-60 Spindle No. 40 SATH Taper	2	40" x 9" or 46" x 9" Center of Spindle to overarm: 5 $\frac{1}{2}$ " Length of Arbor: Max. 18"	50 to 1000 8 changes	$\frac{1}{4}$ " to 9 $\frac{1}{2}$ " 8 changes	L=26" or 32" V=16" C=9"
Vertical No. 1-40 Spindle No. 9 B. & S.	1	30" x 8" or 34" x 8" End of Spindle to Table: Max. 16" Min. 0" $\frac{1}{8}$ " to 1" End Mills in Tool Steel	120 to 2450 12 changes	$\frac{5}{8}$ " to 21 $\frac{1}{2}$ " 4 changes	L=16" or 20" V=16" C=9" VH=31 $\frac{1}{4}$ "
No. 1-55 Spindle No. 9 B. & S.	1	40" x 9" or 46" x 9" End of Spindle to Table: Max. 18 $\frac{1}{2}$ " Min. 0" $\frac{1}{8}$ " to 1 $\frac{1}{2}$ " End Mills in Tool Steel	80 to 2700 12 changes	$\frac{1}{4}$ " to 9 $\frac{1}{2}$ " 8 changes	L=26" or 32" V=17" C=9" VH=51 $\frac{1}{4}$ "

**United States Machine Tool Co., Div. U.S.  
Burke Machine Tool Co., Cincinnati 16, O.**

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
Plain No. 1	1 or 1½	6¼" x 22¼"	100 to 1460 RPM or to max. of 3600 RPM	Infinite	L=18" V=   Knee=15¼"   Head=5" C=5" VH=18"
Plain Automatic Cycle No. 1	1 or 1½	6¼" x 22¼"	60 to 1460 RPM or to max. of 600	Infinite	L=18" V=   Knee=15¼"   Head=5" C=5" VH (Optional)

**Brown and Sharpe Mfg. Co., Providence, R. I.**

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
Vertical No. 2-5 H.P.	5	Table working surface, 50" x 10"  Greatest distance, end of spindle to top of table, with spindle vertical, 18¼"  Distance, center of spindle to face of column, 11"	10 to 1530 R.P.M. (18 changes)	1" to 20¼" (18 changes)	L=28" V=14½" C=12" VH=5" (Hand)
Plain No. 3B-Std. Type	7½	Table working surface, 36¼" x 14"  Greatest distance, face of column to arm braces, 27½"  Greatest distance, center of spindle to top of table, 19½"	30 to 1200 R.P.M. (16 changes)	Longitudinal and Transverse, 11/16" to 26" (16 changes)  Vertical, 9/32" to 10½" (16 changes)	L=34" V=19½" C=12"
Universal No. 3A-Std. Type	7½	Table working surface, 59¼" x 14"  Greatest distance, face of column to arm braces, 27½"  Greatest distance, center of spindle to top of table, 18½"	30 to 1200 R.P.M. (16 changes)	Longitudinal and Transverse, 11/16" to 26" (16 changes)  Vertical, 9/32" to 10½" (16 changes)	L=34" V=18½" C=12"



**Brown & Sharpe Mfg. Co., Providence, R.I.**

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
<b>Plain</b> No. 2-3 H.P.	3	Table working surface, 50" x 10"  Greatest distance, lower face of column to arm braces, 26 $\frac{1}{8}$ "  Greatest distance, center of spindle to top of table, 15 $\frac{1}{2}$ "	40 to 1530 R.P.M. (18 changes)	$\frac{1}{16}$ " to 20 $\frac{1}{4}$ " (18 changes)	L=28" V=15" C=10"
<b>Universal</b> No. 2-3 H.P.	3	Table working surface, 50" x 10"  Greatest distance, lower face of column to arm braces, 26 $\frac{1}{8}$ "  Greatest distance, center of spindle to top of table, 15"	40 to 1530 R.P.M. (18 changes)	$\frac{1}{16}$ " to 20 $\frac{1}{4}$ " (18 changes)	L=28" V=15" C=10"
<b>Vertical</b> No. 2-3 H.P.	3	Table working surface, 50" x 10"  Greatest distance, end of spindle to top of table, with spindle vertical, 18 $\frac{1}{4}$ "  Distance, center of spindle to face of column, 12"	50 to 1800 R.P.M. (18 changes)	$\frac{1}{16}$ " to 20 $\frac{1}{4}$ " (18 changes)	L=28" V=15" C=12" VH=3" (Hand)
<b>Plain</b> No. 2-5 H.P.	5	Table working surface, 50" x 10"  Greatest distance, lower face of column to arm braces, 26 $\frac{1}{8}$ "  Greatest distance, center of spindle to top of table, 17 $\frac{1}{2}$ "	30 to 1200 R.P.M. (18 changes)	$\frac{1}{16}$ " to 20 $\frac{1}{4}$ " (18 changes)	L=28" V=16 $\frac{1}{2}$ " C=10"
<b>Universal</b> No. 2-5 H.P.	5	Table working surface, 50" x 10"  Greatest distance, lower face of column to arm braces, 26 $\frac{1}{8}$ "  Greatest distance, center of spindle to top of table, 17"	30 to 1200 R.P.M. (18 changes)	$\frac{1}{16}$ " to 20 $\frac{1}{4}$ " (18 changes)	L=28" V=16 $\frac{1}{2}$ " C=10"

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
Plain No. 1-H	3	40" x 9"	35-1400	1/2"-20"	L=22" C=8" V=16"
Universal No. 1-H	3	40" x 9"	35-1400	1/2"-20"	L=22" C=8" V=16"
Vertical No. 1-H	3	40" x 9"	35-1400	1/2"-20"	L=22" C=8" V=16" Swivel Head Rotates 45°
No. 2E	3	46" x 12"	25 to 1000	1/2" to 12 1/2"	L=28" C=10" V=17"
No. 2-HL	3	46" x 9"	35 to 1400	1/2" to 20"	L=28" C=10" V=16"
No. 2-H	5	50" x 10"	35 to 1400	1/2" to 20"	L=28" C=10" V=16"
No. 2-CK	10 (spindle) 3 (feed)	56" x 13 1/2"	15 to 1500	1/8" to 90"	L=28" C=10" V=17"
No. 2-CSM	20 (spindle) 3 (feed)	56" x 13 1/2"	50 to 1250	1/8" to 90"	L=28" C=10" V=17"
Universal No. 2-E	3	46" x 12"	25 to 1000	1/2" to 12 1/2"	L=28" C=10" V=17"
No. 2-HL	3	46" x 9"	35 to 1400	1/2" to 20"	L=28" C=10" V=16"
No. 2-H	5	50" x 10"	35 to 1400	1/2" to 20"	L=28" C=10" V=16"
No. 2-CK	10 (spindle) 3 (feed)	56" x 13 1/2"	15 to 1500	1/8" to 90"	L=28" C=10" V=17"
Vertical No. 2-HL	3	46" x 9"	35-1400	1/2" to 20"	L=28" C=10" V=16" Swivel Head Rotates 360°
No. 2-H	5	50" x 10"	35-1400	1/2" to 20"	L=28" C=10" V=16"
No. 2-K	7 1/2	56" x 12"	15-1500	1/8" to 90"	L=28" C=12" V=14" VH=4"
No. 2-CSM	20	56" x 13 1/2"	50-1250	1/8" to 90"	L=28" C=12" V=14" VH=6"
Plain No. 3-CH	7 1/2 (spindle) 3 (feed)	64" x 13 1/2"	15 to 1500	1/8" to 90"	L=34" C=12" V=18"
No. 3-CK	15 (spindle) 3 (feed)	64" x 13 1/2"	15 to 1500	1/8" to 90"	L=34" C=12" V=18"
No. 3-CSM	20 (spindle) 3 (feed)	64" x 13 1/2"	50 to 1250	1/8" to 90"	L=34" C=12" V=18"
No. 3-CSM	30 (spindle) 3 (feed)	64" x 13 1/2"	50 to 1250	1/8" to 90"	L=34" C=12" V=18"
Universal No. 3-CH	7 1/2 (spindle) 3 (feed)	64" x 13 1/2"	15 to 1500	1/8" to 90"	L=34" C=12" V=18"
No. 3-CK	15 (spindle) 3 (feed)	64" x 13 1/2"	15 to 1500	1/8" to 90"	L=34" C=12" V=18"
Vertical No. 3-H	7 1/2	64" x 13 1/2"	20 to 1000	1/2" to 30"	L=34" C=12" V=14" VH=6"
No. 3-K	10	64" x 15 1/2"	15 to 1500	1/8" to 90"	L=34" C=12" V=16" VH=7"
No. 3-CSM	20	64" x 13 1/2"	50 to 1250	1/8" to 90"	L=34" C=12" V=14" VH=4"
No. 3-CSM	30	64" x 13 1/2"	50 to 1250	1/8" to 90"	L=34" C=12" V=16" VH=4"
Plain No. 4-CH	10 (spindle) 3 (feed)	74" x 15 1/2"	15 to 1500	1/8" to 90"	L=42" C=14" V=21"
No. 4-CK	25 (spindle) 3 (feed)	82" x 18"	13 to 1300	1/8" to 90"	L=42" C=14" V=21"
No. 4-CSM	30 (spindle) 3 (feed)	74" x 15 1/2"	50 to 1250	1/8" to 90"	L=42" C=14" V=18"
No. 4-CSM	50 (spindle) 3 (feed)	82" x 18"	50 to 1250	1/8" to 90"	L=42" C=14" V=21"

**Kearney & Trecker Corp.**
**6784 W. National Ave., Milwaukee 14, Wis.**

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L—Longitudinal V—Vertical C—Cross VH—Vertical Head
Universal No. 4-CH	10 (spindle) 3 (feed)	74" x 15½"	15 to 1500	⅛" to 90"	L=42" C=14" V=18"
No. 4-CK	25 (spindle) 5 (feed)	82" x 18"	13 to 1300	⅛" to 90"	L=42" C=14" V=21"
Vertical No. 4-H	10	74" x 15½"	20 to 1000	½" to 30"	L=42" V=16" C=14" VH=7"
No. 4-K	15	82" x 18"	13 to 1300	⅛" to 90"	L=42" V=20" C=16" VH=8"
No. 4-CSM	30	74" x 15½"	50 to 1250	⅛" to 90"	L=42" V=16" C=14" VH=4"
No. 4-CSM	50	82" x 18"	50 to 1250	⅛" to 90"	L=50" V=20" C=16" VH=4"
Plain No. 5-CK	25 (spindle) 5 (feed)	94" x 18"	13 to 1300	⅛" to 90"	L=50" C=16" V=21"
No. 5-CSM	50 (spindle) 5 (feed)	94" x 18"	50 to 1250	⅛" to 90"	L=50" C=16" V=21"
Universal No. 5-CK	25 (spindle) 5 (feed)	94" x 18"	13 to 1300	⅛" to 90"	L=50" C=16" V=21"
Vertical No. 5-H	20	94" x 18"	13 to 1300	½" to 90"	L=50" V=20" C=16" VH=8"
No. 5-CSM	50	94" x 18"	50 to 1250	⅛" to 90"	L=50" V=20" C=16" VH=4"
No. 5-CSM	25	94" x 18"	13 to 1300	⅛" to 90"	L=50" V=20" C=16" VH=4"
Plain No. 6-CK	25 (spindle) 5 (feed)	108" x 18"	13 to 1300	⅛" to 90"	L=60" C=16" V=21"
No. 6-CSM	50 (spindle) 5 (feed)	108" x 18"	50 to 1250	⅛" to 90"	L=60" C=16" V=21"
Universal No. 6 Consult Factory					
Vertical No. 6-CSM	25	108" x 18"	13 to 1300	⅛" to 90"	L=60" V=20" C=16" VH=4"
No. 6-CSM	50	108" x 18"	50 to 1250	⅛" to 90"	L=60" V=20" C=16" VH=4"
Plain Auto. Cycle No. 1-AC	3	38" x 14"	35 to 1400	⅛" to 20"	L=18" C=6" V=14"
No. 1-AC	3	44" x 14"	35 to 1400	⅛" to 20"	L=24" C=6" V=14"
Vertical Auto. Cycle No. 1-AC	3	38" x 14"	35 to 1400	⅛" to 20"	L=18" Swivel C=6" Head V=14" Vertical
No. 1-AC	3	44" x 14"	35 to 1400	⅛" to 20"	L=24" Machines C=6" Head Rotates V=14" 360°
Plain Auto. Cycle No. 2-H	5	50" x 10"	35 to 1400	⅛" to 20"	L=28" C=10" V=17"
No. 2-CK	10 (spindle) 3 (feed)	56" x 13½"	15 to 1500	⅛" to 90"	L=28" C=10" V=17"
No. 2-CSM	20 (spindle) 3 (feed)	56" x 13½"	50 to 1250	⅛" to 90"	L=28" C=10" V=17"
Vertical Auto. Cycle No. 2-H	5	50" x 10"	35 to 1400	½" to 20"	L=28" V=15" C=12" VH=4"
No. 2-K	7½	56" x 12"	15 to 1500	⅛" to 90"	L=28" V=14" C=12" VH=6"
No. 2-CSM	20	56" x 13½"	50 to 1250	⅛" to 90"	L=28" V=14" C=12" VH=4"

Type Size and Model	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
<b>Plain</b>					
Auto. Cycle No. 3-CH	7½ (spindle) 3 (feed)	64" x 13½"	75 to 1500	⅜" to 90"	L=34" C=12" V=17"
No. 3-CK	15 (spindle) 3 (feed)	64" x 15½"	75 to 1500	⅜" to 90"	L=34" C=12" V=18"
No. 3-CSM	20 (spindle) 3 (feed)	64" x 13½"	50 to 1250	⅜" to 90"	L=34" C=12" V=17"
No. 3-CSM	30 (spindle) 3 (feed)	64" x 15½"	50 to 1250	⅜" to 90"	L=34" C=12" V=17"
<b>Vertical</b>					
Auto. Cycle No. 3-4H	7½	64" x 13½"	20 to 1000	⅜" to 30"	L=34" V=14" C=12" VH=16"
No. 3-K	10	64" x 15½"	15 to 1500	⅜" to 90"	L=34" V=16" C=14" VH=17"
No. 3-CSM	20	64" x 13½"	50 to 1250	⅜" to 90"	L=34" V=16" C=12" VH=17"
No. 3-CSM	30	64" x 15½"	50 to 1250	⅜" to 90"	L=34" V=16" C=14" VH=17"
<b>Plain</b>					
Auto. Cycle No. 4-CH	10 (spindle) 3 (feed)	74" x 15½"	15 to 1500	⅜" to 90"	L=42" C=14" V=18"
No. 4-CK	25 (spindle) 5 (feed)	82" x 10"	13 to 1300	⅜" to 90"	L=42" C=14" V=21"
No. 4-CSM	30 (spindle) 3 (feed)	74" x 15½"	50 to 1250	⅜" to 90"	L=42" C=14" V=18"
No. 4-CSM	50 (spindle) 5 (feed)	82" x 18"	50 to 1250	⅜" to 90"	L=42" C=14" V=21"
<b>Vertical</b>					
Auto. Cycle No. 4-4H	10	74" x 15½"	20 to 1000	⅜" to 30"	L=42" V=16" C=14" VH=17"
No. 4-K	15	82" x 18"	13 to 1300	⅜" to 90"	L=42" V=20" C=16" VH=18"
No. 4-CSM	30	74" x 15½"	50 to 1250	⅜" to 90"	L=42" V=16" C=14" VH=17"
No. 4-CSM	50	82" x 18"	50 to 1250	⅜" to 90"	L=42" V=20" C=16" VH=18"
<b>Plain</b>					
Auto. Cycle No. 5-CK	25 (spindle) 5 (feed)	96" x 18"	13 to 1300	⅜" to 90"	L=50" C=16" V=21"
No. 5-CSM	50 (spindle) 5 (feed)	96" x 18"	50 to 1250	⅜" to 90"	L=50" C=16" V=21"
<b>Vertical</b>					
Auto. Cycle No. 5-4H	20	96" x 18"	13 to 1300	⅜" to 30"	L=50" V=20" C=16" VH=18"
No. 5-CSM	25	96" x 18"	13 to 1300	⅜" to 90"	L=50" V=20" C=16" VH=18"
No. 5-CSM	50	96" x 18"	50 to 1250	⅜" to 90"	L=50" V=20" C=16" VH=18"
<b>Plain</b>					
Auto. Cycle No. 6-CK	25 (spindle) 5 (feed)	118" x 18"	13 to 1300	⅜" to 90"	L=60" C=16" V=21"
No. 6-CSM	50 (spindle) 5 (feed)	118" x 18"	50 to 1250	⅜" to 90"	L=60" C=16" V=21"
<b>Vertical</b>					
Auto. Cycle No. 6-CSM	25	118" x 18"	13 to 1300	⅜" to 90"	L=60" V=20" C=16" VH=18"
No. 6-CSM	50	118" x 18"	50 to 1250	⅜" to 90"	L=60" V=20" C=16" VH=18"

# The Cincinnati Milling Machine Co.

Cincinnati 9, Ohio

Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
<b>Plain</b>					
No. 1-LT	2	46 1/4" x 9"	28 to 1160—12 speeds	1/4" to 30"—16 feeds	L=22"; V=17"; C=8"
No. 1-LT	2	46 1/4" x 9"	28 to 1160—12 speeds	1/4" to 30"—16 feeds	L=22"; V=16"; C=8"
No. 2-MI	3	49" x 9 1/2"	25 to 1500—16 speeds	1/4" to 30"—16 feeds	L=28"; V=17"; C=10"
No. 2-MI	5	49" x 10"	25 to 1500—16 speeds	1/4" to 30"—16 feeds	L=28"; V=19"; C=10"
*No. 2 Dial type, med. speed	7 1/2	52-11/16" x 12 1/4"	20 to 500—16 speeds	5/16" to 20"—16 feeds	L=28"; V=19"; C=10"
**No. 2 Dial type hi speed	7 1/2	52-11/16" x 12 1/4"	20 to 1500—16 speeds	5/16" to 60"—16 feeds	L=28"; V=19"; C=10"
<b>Universal</b>					
No. 2-MI	3	49" x 9 1/2"	25 to 1500—16 speeds	1/4" to 30"—16 feeds	L=28"; V=16"; C=10"
No. 2-MI	5	49" x 10"	25 to 1500—16 speeds	1/4" to 30"—16 feeds	L=28"; V=18"; C=10"
*No. 2 Dial type, med. speed	7 1/2	52-11/16" x 12 1/4"	20 to 500—16 speeds	5/16" to 20"—16 feeds	L=28"; V=18"; C=10"
**No. 2 Dial type, hi-speed	7 1/2	52-11/16" x 12 1/4"	20 to 1500—16 speeds	5/16" to 60"—16 feeds	L=28"; V=18"; C=10"
<b>Vertical</b>					
No. 2-MI	5	49" x 10"	25 to 1500—16 speeds	1/4" to 30"—16 feeds	L=28" C=12" V=14" VH=4"
*No. 2 Dial type med. speed	7 1/2	52-11/16" x 12 1/4"	20 to 500—16 speeds	5/16" to 20"—16 feeds	L=28" C=12" V=13" VH=6"
**No. 2 Dial type hi speed	7 1/2	52-11/16" x 12 1/4"	20 to 1500—16 speeds	5/16" to 60"—16 feeds	L=28" C=12" V=13" VH=6"
<b>Plain</b>					
No. 3-MI	7 1/2	62 1/2" x 14"	25 to 1500—16 speeds	1/4" to 30"—16 feeds	L=34" V=20"; C=12"
*No. 3 Dual type med. speed	10	62 1/2" x 15 1/4"	18 to 450—16 speeds	5/16" to 20"—16 feeds	L=34" V=20"; C=12"
**No. 3 Dual type hi speed	10	62 1/2" x 15 1/4"	18 to 1300—16 speeds	5/16" to 60"—16 feeds	L=34" V=20"; C=12"
*No. 3 High power dial type	15	64 1/4" x 16"	16 to 1600—24 speeds	1/4" to 60"—32 feeds	L=34" V=19"; C=12"
**No. 3 Dual power dial type	20	64 1/4" x 16"	16 to 1600—24 speeds	1/4" to 60"—32 feeds	L=34" V=19"; C=12"
<b>Universal</b>					
No. 3-MI	7 1/2	62 1/2" x 14"	25 to 1500—16 speeds	1/4" to 30"—16 feeds	L=34" V=19"; C=12"
*No. 3 Dual type med. speed	10	62 1/2" x 15 1/4"	18 to 450—16 speeds	5/16" to 20"—16 feeds	L=34" V=19"; C=12"
**No. 3 Dual type hi speed	10	62 1/2" x 15 1/4"	18 to 1300—16 speeds	5/16" to 60"—16 feeds	L=34" V=19"; C=12"
*No. 3 Hi power dial type	15	64 1/4" x 16"	16 to 1600—24 speeds	1/4" to 60"—32 feeds	L=34" V=18"; C=12"
**No. 3 Dual power dial type	20	64 1/4" x 16"	16 to 1600—24 speeds	1/4" to 60"—32 feeds	L=34" V=18"; C=12"
<b>Vertical</b>					
*No. 3 Dual type med. speed	10	62 1/2" x 15 1/4"	18 to 450—16 speeds	5/16" to 20"—16 feeds	L=34" C=16" V=16" VH=6"
**No. 3 Dual type hi speed	10	62 1/2" x 15 1/4"	18 to 1300—16 speeds	5/16" to 60"—16 feeds	L=34" C=16" V=16" VH=6"
*No. 3 Hi power dial type	15	64 1/4" x 16"	16 to 1600—24 speeds	1/4" to 60"—32 feeds	L=34" C=14" V=14" VH=6"
**No. 3 Dual power dial type	20	64 1/4" x 16"	16 to 1600—24 speeds	1/4" to 60"—32 feeds	L=34" C=14" V=14" VH=6"
<b>Plain</b>					
*No. 4 Dual type med. speed	15	78 1/2" x 16 1/4"	18 to 450—16 speeds	5/16" to 20"—16 feeds	L=42" V=20"; C=14"
**No. 4 Dual type hi speed	15	78 1/2" x 16 1/4"	18 to 1300—16 speeds	5/16" to 60"—16 feeds	L=42" V=20"; C=14"
*No. 4 Hi power dial type	20	80" x 18"	16 to 1600—24 speeds	1/4" to 60"—32 feeds	L=42" V=20"; C=14"
**No. 4 Dual power dial type	30	80" x 18"	16 to 1600—24 speeds	1/4" to 60"—32 feeds	L=42" V=20"; C=14"

\*AUTOMATIC TABLE CYCLE SUPPLIED ON DEMAND ONLY.

\*\*AUTOMATIC TABLE CYCLE SUPPLIED AS STANDARD EQUIPMENT AT NO EXTRA COST.

# The Cincinnati Milling Machine Co.

Cincinnati 9, Ohio

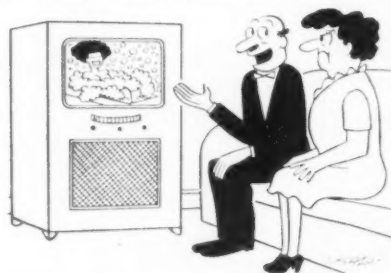
Size and Model Type	H.P.	Working Capacity	Speed Range (RPM)	Feed Range (IPM)	Travel Capacity L=Longitudinal V=Vertical C=Cross VH=Vertical Head
<b>Universal</b>					
*No. 4 Dual type mod. speed	15	78½" x 16¼"	18 to 450—16 speeds	⅜" to 20"—16 feeds	L=42"; V=19"; C=14"
*No. 4 Dual type hi speed	15	78½" x 16¼"	18 to 1300—16 speeds	5/16" to 60"—16 feeds	L=42"; V=19"; C=14"
**No. 4 Hi power dial type	20	80" x 18"	16 to 1600—24 speeds	¼" to 60"—32 feeds	L=42"; V=19"; C=14"
**No. 4 Dual power dial type	30	80" x 18"	16 to 1600—24 speeds	¼" to 60"—32 feeds	L=42"; V=19"; C=14"
<b>Vertical</b>					
*No. 4 Dual type mod. speed	15	78½" x 16¼"	18 to 450—16 speeds	⅜" to 20"—16 feeds	L=42" V=16" C=16" VH=6"
*No. 4 Dual type hi speed	15	78½" x 16¼"	18 to 1300—16 speeds	5/16" to 60"—16 feeds	L=42" V=16" C=16" VH=6"
**No. 4 Hi power dial type	20	80" x 18"	16 to 1600—24 speeds	¼" to 60"—32 feeds	L=42" V=16" C=16" VH=7"
**No. 4 Dual power dial type	30	80" x 18"	16 to 1600—24 speeds	¼" to 60"—32 feeds	L=42" V=16" C=16" VH=7"
<b>Plain</b>					
No. 5 Hi power dial type	25	94½" x 20"	14 to 1400—24 speeds	¼" to 60"—32 feeds	L=50"; V=20"; C=14"
**No. 5 Dual power dial type	50	94½" x 20"	14 to 1400—24 speeds	¼" to 60"—32 feeds	L=50"; V=20"; C=14"
<b>Universal</b>					
No. 5 Hi power dial type	25	94½" x 20"	14 to 1400—24 speeds	¼" to 60"—32 feeds	L=50"; V=19"; C=14"
<b>Vertical</b>					
No. 5 Hi power dial type	25	94½" x 20"	14 to 1400—24 speeds	¼" to 60"—32 feeds	L=50" V=16" C=18" VH=8"
**No. 5 Dual power dial type	50	94½" x 20"	14 to 1400—24 speeds	¼" to 60"—32 feeds	L=50" V=16" C=18" VH=8"
<b>Plain</b>					
No. 6 Hi power dial type	25	104½" x 20"	14 to 1400—24 speeds	¼" to 60"—32 feeds	L=60"; V=20"; C=14"
*No. 6 Dual power dial type	50	104½" x 20"	14 to 1400—24 speeds	¼" to 60"—32 feeds	L=60"; V=20"; C=14"
<b>Vertical</b>					
No. 6 Hi power dial type	25	104½" x 20"	14 to 1400—24 speeds	¼" to 60"—32 feeds	L=60" V=16" C=18" VH=8"
**No. 6 Dual power dial type	50	104½" x 20"	14 to 1400—24 speeds	¼" to 60"—32 feeds	L=60" V=16" C=18" VH=8"

\*AUTOMATIC TABLE CYCLE SUPPLIED ON DEMAND ONLY.

\*\*AUTOMATIC TABLE CYCLE SUPPLIED AS STANDARD EQUIPMENT AT NO EXTRA COST.

Appointment of Norman A. Strang as assistant advertising manager of SKF Industries, Inc., Philadelphia was announced by R. R. Zisette, general sales manager.

Appointment of Lawrence J. Kline as sales manager of its Automatic division has been announced by the Automatic Transportation Company, Chicago.



Some of these soap commercials are pretty good.



**Now**

# Dialize Your AGD Snap Gages



**Your AGD  
Adjustable Limit  
Snap Gage**

+



=



**Low Cost  
Dial Gage**

*\*Patent Applied For*

## Easy to Install!

Remove a pair of pins from an AGD Adjustable Limit Snap Gage . . . install this new STANDARD Dializer . . . and you have an indicating DIAL SNAP GAGE! It's as easy as that . . . and far less expensive than buying an equivalent dial snap gage.

Dializer No. 1 for Frames 1 thru 6  
Dializer No. 2 for Frames 7 thru 10  
Dializer No. 3 for Frames 11 thru 16

- ★ ASSURES ACCURACY by use of double reed principle.

## OUT of the LUXURY CLASS!

**NO LONGER** can you afford to be without the benefits of quantitative dial measurements. The STANDARD Dializer is priced way below an equivalent Dial Snap Gage. Even if you have to buy a new AGD snap to convert, you save on an overall basis.

- ★ EASILY INSTALLED in your AGD Adjustable Limit Snap Gages . . . any make.
- ★ CONVERTS any AGD Model — A, B or C, any size.
- ★ RANGE OF ADJUSTMENT is same as before dializing.
- ★ INDICATOR furnished with either .0001" or .001" graduations.

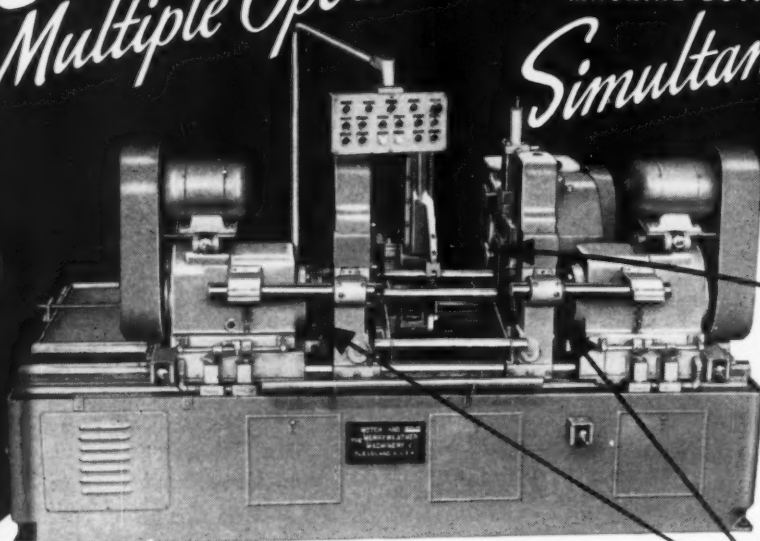
**STANDARD GAGE CO., Inc., Poughkeepsie, N.Y.**

# UNITIZE

## Multiple Operations!

CUT OFF TO LENGTH AND  
MACHINE BOTH ENDS —

## Simultaneously



**Cuts Off  
to Length**

Capitalize on Motch & Merryweather's fast accurate circular sawing by combining it with simultaneous double-end machining operations. Save handling and floor space! Increase output and reduce cost! Unitize your production.



**Operation:** Cut off; bore and chamfer inside and outside, both ends

**Material:** SAE 1020 steel tubing.

**Production:** 140 pcs/hr. @ 100% eff.



**Operation:** Cut off; hollow mill and center drill both ends.

**Material:** C 1117 cold drawn steel.

**Production:** 84 pcs/hr. @ 100% eff.

Write for further information.



**Operation:** Cut off; face and chamfer both ends; internal groove one end.

**Material:** C 1015 seamless steel tubing.

**Production:** 110 pcs/hr. @ 100% eff.

## Machines Both Ends

- Chamfers both ends • Center drills both ends • Center drills and chamfers both ends • Threads both ends • Turns one or both ends (box tool)
- Chamfers O. D. and I. D. of tubing • Reams one or both ends of tubing • Chamfers O. D. and reams both ends of tubing • External grooves and chamfers one or both ends
- Internal grooves, faces and chamfers O. D. and I. D. one or both ends of tubing

Manufactured by

**THE MOTCH & MERRYWEATHER MACHINERY COMPANY**  
715 PENTON BUILDING • CLEVELAND 13, OHIO  
Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT





# Letter from Great Britain

This month's letter is being written by **Clifford T. Bower** of Machine Shop Magazine, London, in place of Mr. Hutcheson, who is currently touring the U.S.

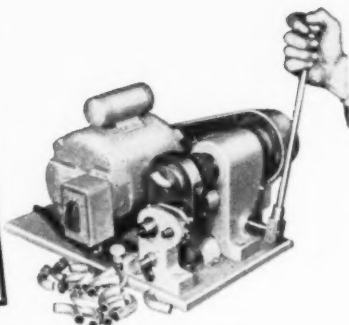
**Interest in better materials handling** has increased considerably among British production engineers recently. The report of the Anglo-American Productivity team who visited your country has just been published and an intensive drive to distribute copies throughout industry has been started. The Institution of Production Engineers has planned a series of one-day conferences on materials handling to take place in various parts of Britain during the next twelve months and these conferences will be implemented by a report to be issued by the Institution's Research Committee. One or two important conclusions have been reached by the team who visited the U.S.A. One is that productivity in British industry can be increased by a better plant layout so that work is moved a minimum distance between operations. Another conclusion is that a lot of man-handling of work can be replaced by the use of power tools and mechanical equipment. The amount of horse-power available to U.S. workers was emphasised once more in the Team's report. At a recent one-day conference in Coventry, the automobile manufacturing centre, it was pointed out that horse-power per worker could not be increased in Britain without an

increase in electric power generating capacity. Power cuts due to excessive demand on our electrical distributing and generating facilities are still impeding industry.

**Underground gasification** of coal has been discussed for some years as a means of extracting power from those of our coal seams that are thin and unworkable, and an experimental project has been started at Chesterfield. Two days before this letter was written a combustible gas was produced from a 60 ft. deep seam and the Ministry of Fuel and Power are optimistic about the future possibilities of the scheme. The coal seam was ignited by means of two electrically fired incendiary bombs and a quantity of wood, an air blast helped to start the combustion. This experiment will lead to bigger projects which, it is hoped, will enable surface power stations driven by gas turbines to provide more electric power for industry.

**Allocation of steel.** The steel distribution scheme under which most British steel-consuming industries had their supplies allocated by the Government has ended. The step has been advised by industrial leaders for a considerable time and is justified by the constant rise in steel output. Sheet steel used by the motor-car industry and tin-plate is not covered by the new order.

**New PINES**  
**Tube & Rod**  
**END-FINISHING**  
**MACHINE**  
**SPEEDS**  
**WORK OUTPUT**



**Completes 500 to 1,000 Pieces Per Hour**

A broad range of end-finishing operations can now be handled with speed and precision on this new Pines bench-type end-finishing machine. It embodies a new type mechanical chuck and chuck closing mechanism that cuts production time. Jaws are arranged for interchangeable split-type inserts to accommodate any length tube, pipe or rod.

**Profitable Uses**

- Deburring
- Inside and Outside Chamfering
- Facing
- Center Drilling
- Drilling
- Reaming
- Single Point Boring
- Light Forming
- Turning

**Brief Specifications**

**Capacity:** Up to 2" diameter—any length.  
**Cutters:** 3 adjustable —4 to cover range.  
**Motor:** 1/2 h.p. with step sheave.  
**Weight:** 170 lbs.

**3 Operations in 1 Motion of Handle**

One movement of the operating handle quickly clamps the workpiece, removes the stock stop, and feeds the cutter to the work. Release of the handle returns the chuck to its original position and simultaneously unclamps the piece. Thus, with *one hand free for loading* the machine, an operator can speed work output.

**For long-run work,** there's a fully automatic Pines Model with foot-control to help you save additional time. Models up to 5" capacity are also available.

**Write for free bulletin**

Get more facts today on this new, time-saving production tool. Find out how it will help you save time on your work.



Together, they represent less than one-fifth of the total steel production. Distribution arrangements for the control of certain types of tubes and pipes will continue for the time being and if any shortages of any type of steel should occur as a result of de-control, legislation can be taken to deal with the situation. Mr. G. B. Thomas, deputy chairman and managing director of Hadfields, one of Sheffield's largest steel firms, employing 5,000 workers, said: "We have been expecting this announcement for some time. Controls

could have been removed any time during the past 12 months."

**The race for oil supremacy in the Middle East** is going to British firms according to statements by leading experts. Last year Britain produced three-fifths of the total of 56 million tons of crude oil while American firms produced the rest. Development projects aim at an increase in production to 130 million tons by 1933 with Britain retaining the above share. A challenge to the American monopoly of heavy motorised equipment for oil field use

## For Quick, Efficient On-Location Clamping Use Knu-Vise Portable Vises



**P-400**

For clamping when space is limited

Equipped with various spindle types—steel or copper, or rubber capped



**FGP-400**

Spindle automatically adjusts itself to total thickness of materials held



**P-1203**

**P-1204**

**P-1206**

**P-1200**

Available in 4 standard throat gaps—1½", 2½", 3½" and 6"

Whether you clamp tiny parts requiring pressures of a few pounds or want to hold together huge assemblies that need pressures of around 1800 pounds, Knu-Vise Toggle-action pliers will provide the dependable service you need.

Made to most exacting specifications resulting from exhaustive laboratory tests and years of practical use among leading industries.

### Special Models on Request

Ask for complete catalog

**Consult us direct or our representative engineer near you**

Buffalo, N. Y., J. H. England  
Chicago 20, Ill., Larry P. Wood  
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Houston, Texas, L. H. Creasy  
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Oakland, Calif., Bues Prod. Equip. Co.  
Philadelphia, Pa., Jackson Walter Co.  
Seattle, Washington, Norwes Company  
St. Louis, Mo., Moehlmann Engr., Inc.  
Poland, Ohio, P. L. Duer

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is made by the firm of Thornycroft with a new design of heavy tractor, low-loading machinery trailer and pipe carrying trailer. The loaded gross weight is 224,000 lb. and 240 h.p. is available to propel it at a top speed of 28 miles per hour. The tractor's overall length is 31 ft. 10 ins. and it has a width of 10 ft. 3 ins. It is the largest and most powerful vehicle ever built in Britain. The vehicle design is entirely new including the engine which is a Rover "Meteorite" V-8 diesel rated at 250 h.p. at 2,000 r.p.m.

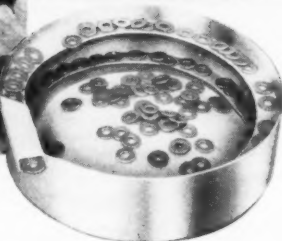
**Aircraft.** The volume of work in the aircraft building industry is not likely to be reduced during the next three years according to Mr. Strauss, Minister of Supply. He was discussing the possible problem of labour redundancy in the industry with representatives of the engineering unions. The labour force increased steadily during 1948 and 1949 and it has now fallen back to the early 1948 level. It is hoped that Government orders for aircraft will be so distributed as to minimise labour fluctuations.

**Feeding  
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**In Oriented Position  
At A Controllable Rate**

**Automatically**

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*"Vibratory"*

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them out, one at a time in the desired, oriented position.

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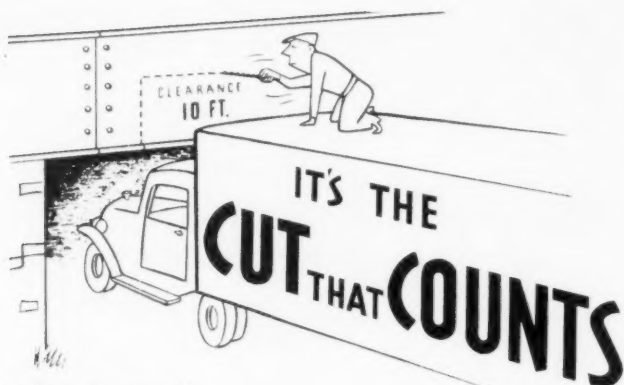
*Send samples of your troublesome parts for recommendation and quotation.*

**SYNTRON CO.**  
300 Lexington Ave.      Homer City, Pa.

The British Industries Fair held this year at London and Birmingham is said to be the most successful ever, so far as attendance figures are concerned. At the London section was shown the first working model of an atomic pile to be shown in this country. The model is 9 ft. high and represents the larger of the piles now operating at Harwell. One side of the model is open to depict the interior through the 6 ft. concrete wall which surrounds the pile.

Anglo-American Productivity teams have a questionable value, according to a leading article which appeared in a recent issue of one of our important engineering journals. While admitting that visits to the U.S.A. by British teams cannot fail to broaden their members' minds and outlook, the article sympathises with those industrialists who refuse to avail themselves of this form of Marshall Aid. One important point made by the article is that team members journey overseas





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Thanks to Capewell's exclusive "Statistical Quality Control" during manufacture, you get a bonus of 10% additional cutting because standards are raised and sub-standard blades have been eliminated. In addition, you get another advantage exclusive with Capewell—the printed blade, carrying instructions for proper use.

Ask your distributor, too, for these other top-grade Capewell tools: hack saw frames, band saws (in coils or welded), Dafilés, ground flat stock, compass and keyhole saws, and hammers.



**THE CAPEWELL MFG. CO.**

Dept. 87

Hartford 2, Conn.

at great expense to visit industrial organisations which are, in some cases, less efficient than their British counterparts. It is suggested that team members who are unfamiliar with the best practices in Britain should first familiarise themselves with the British practice. The article asserts that British manufacturers between the two wars, and since, have had no great difficulty in competing on price in export markets with American firms and that high productivity and technical

advances do not necessarily form an alliance, but a conflict. The article implies that high productivity is not necessarily desirable because it hampers swift adaptation to changing conditions. There is a lot to be said for this argument and it is interesting to note that British branches of American firms do not produce goods at lower costs than their all-British competitors. If these arguments are sound it would appear that British manufacturing is operating at optimum efficiency

**"What's in a hole?"**

**"PROFIT, if a Zagar GEARLESS DRILLHEAD Does the drilling!"**

*Zagar Gearless Drillhead mounted on standard press.*

*Zagar Gearless Drillhead drills 385 holes in gas burner at one time.*

Ask for  
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Hundreds of holes at one pass—any number of spindles—any material—any pattern—as close as twice drill diameter. Mounted on drill press or designed as a complete unit. Just tell us your requirements. Delivery as quick as one week.

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**Zagar**

**TOOLS FOR INDUSTRY  
and SPECIAL MACHINERY**

within the internal conditions which apply to this country.

The setting of the slides on horizontal boring machines has, for a long time been accomplished by the use of scales and verniers. The latest British development in this direction is an optical system with which it is claimed the slides can be set to an accuracy of 0.00025 in. without the operator suffering for eyestrain. The new measuring system is applied to the vertically moving boring spindle and to the trans-

verse movement of the work table. The fixed scale on the new system is engraved on glass in increments of 0.01 in. These graduations are projected by means of a lighting system on to a ground-glass screen measuring 1½ x 4 ins., mounted on the moving slide, and greatly enlarged. It is an easy matter for the machine operator to split the one-thousandth graduations on the vernier screen from a normal viewing distance of about 10 ins. between eyes and screen.



## Modern Tools

MTBB  
JULY, 1950

## in Action

### New Drilling Units, Air Operated, Have Hydraulic Check For Feed Control

The Black Drill Company of Cleveland recently introduced a new line of production drilling units operated by air with a hydraulic check for feed control, which features a patented traversing rotor. By eliminating the customary splined shaft and by using heavy duty motor bearings, the torque is applied evenly around the solid motor shaft so that end play is reduced practically to zero. The rotor actually shifts in and out of the magnetic field, with provision being made in the motor windings to compensate for loss of torque and to dissipate the heat.

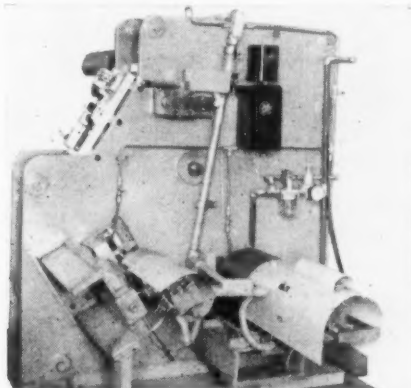
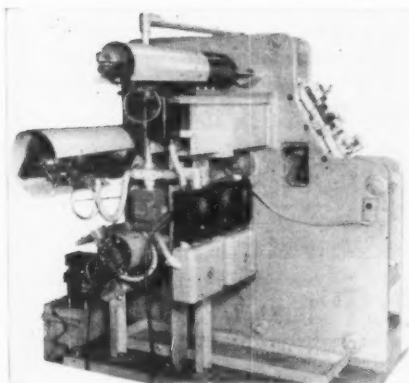
These units are available in all stand-

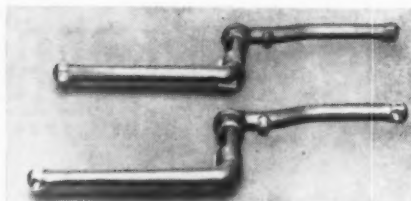
ard induction motor speeds for operation on polyphase current 209, 220, 440, and 550 volt. Standard units are available from  $\frac{1}{4}$  to 3 h.p., special units up to 10 h.p. They are built to operate in any position or at any angle so that they are readily installed in transfer and indexing machines for fully automatic or semi-automatic operation. The design is flexible so that they are easily modified to incorporate extended shafts and extra long strokes, and they can readily be made into excellent tapping units.

An example of how these units can be used is shown in the accompanying photograph of a special machine which

• • •

Rear and front views of the drilling unit.





Bicycle crank before and after machining.

uses five of the Black units. This is a semi-automatic machine which performs four operations on a bicycle crank.

A special  $\frac{3}{4}$  h.p. unit with a 6" stroke, operating at 1150 r.p.m., performs a  $\frac{3}{8}$ " diameter hollow milling operation on the driving lug of the sprocket. This unit was required to have a long stroke in order to clear the frame of the machine at that point. It has 4 inches of non-rotating travel and 2 inches of working travel. A standard length stator is used which means that the rotor leaves the mag-

netic field completely on the return stroke, but the unit has a built-in limit switch that automatically turns the motor on and off as the rotor enters and leaves the magnetic field. This is entirely feasible as the motor gets up to full speed within  $1\frac{1}{2}$  turns of the rotor.

Two standard units  $\frac{3}{4}$  h.p. operate at 840 r.p.m. for a combination operation consisting of a  $7/16$ " tap drill size and a  $\frac{3}{4}$ " diameter spot facing of the bicycle pedal holes. The spot facing is held to close limits through the depth adjustment control on the unit which is capable of holding the tolerance within .001" of required size.

The last operation consists of tapping the two pedal holes  $\frac{1}{2}$ "-20, one right-hand and one left-hand thread, with two opposed tapping units. These are standard tapping units, 540 R.P.M., built by Black Drill Company. A close-up of the unit is shown in the accompanying photograph. The same traversing type rotor is used with controlled air feed, with self contained reversal through a small double acting air cylin-

## Make A Clean Impression!

### Hand-Cut STEEL STAMPS

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Deep, hand-cut letters in special-formula steel assure clean impressions and long service. Face of stamp is angled for extra strength. Chamfered corners for locating the base. Ask for Hoggson Brand at mill supply houses.



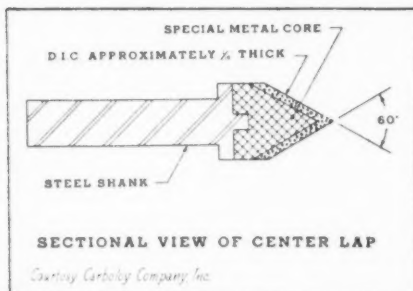
**HOGGSON & PETTIS MFG. CO.,** 141-H BREWERY STREET  
NEW HAVEN, CONN.

der mounted on top of and operating from the same air supply as the main air cylinder. This small air cylinder carries a limit switch that operates through a magnetic reversing starter that reverses the motor at the required tapping depth. Because of the instant reversal and positive depth control, it is possible to tap even blind holes without danger of tap breakage.

All five unit on this machine operate electrically through solenoids and limit switches that will not permit any of the units to advance until the machine has indexed exactly to the proper location, and will not allow the machine to index until the units are completely back in the return position. THE END.

### Diamond Impregnated Carbide Center Laps

For lapping the centers in such hardened steel and nitrided products as shafts, rolls, taps, reamers, gages, etc., diamond impregnated carbide laps, figure 1, will normally provide greatly



increased service life over mounted abrasive points of conventional materials when used and serviced properly. Such carbide laps usually perform best in materials of more than Rockwell C-62 (over Brinell 600). They are especially useful for correcting out of round conditions due to warping in heat treatment; for removing scale or small burrs from centers; for truing up incorrect angles, etc., figure 2.

According to Carbide Company, Inc., Detroit, carbide laps can be used with good results either on special center lapping machines or on improvised drill setups. The stock to be

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FAR SUPERIOR**  
**COMPARISON PROVES IT**



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**MODEL U-TR  
A 60,000 R.P.M. UNIT**

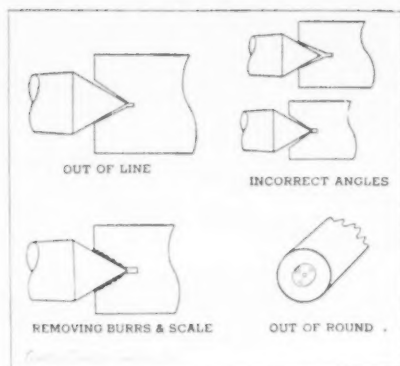
A powerful, fast-cutting tool, streamlined in design, easy to handle. Designed for real production work and the toughest jobs. Precision made, excellent balance. Special grease-sealed bearings . . . no lubrication required. Fitted with steel housing, a special safety feature.

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center lapped is usually held by hand with one end of the work piece resting on a center in the base of the table or machine. The carbide center lap is fed down slowly by hand, with moderate pressure. The lap is usually revolved at from 1,500 to 5,000 rpm. Ordinarily, lapping is performed without lubricant.

Carbide center laps should be reconditioned before wear becomes too pronounced. Thus, only a few thousandths stock will have to be removed, at most. This will greatly prolong the service life of the lap.

Center laps can be reconditioned by regrinding to the desired angle on a tool and cutter grinder, using a soft bond silicon carbide wheel of about 80 grit size. Do not attempt to re-dress carbide center laps with a diamond dresser as is done with ordinary mounted abrasive points or sticks.

### Ball Corners Formed on Standard Press Brakes

In a tool-up developed by the Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago 19, Ill., it is now possible to form ball corners in standard press brakes at a saving of 30 to 50 cents per panel over conventional methods. Additional benefits claimed for this method are improved product appearance, minimum spoilage, elimination of corner welding and finishing, and substantially reduced handling.

With the Verson method, operations start with a square sheared blank. The first operation is to trim developed corners (4 strokes); the second operation is to draw the corners (4 strokes); the third operation is to cam trim after the draw (4 strokes). These first three operations are performed in a single Verson Intermediate Press Brake equipped with three sets of dies.

The fourth operation, restriking the side flanges, also requiring four strokes,

### Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

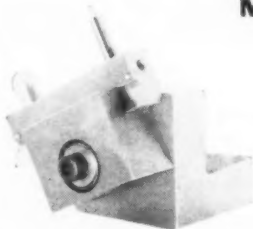
Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from  $\frac{1}{8}$ " to  $\frac{3}{4}$ " U.S.S. Inexpensive — Last for years.



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**NIELSEN TOOL &  
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### MIGHTY MIDGET ANGLE DRESSER PUT ONE ON EVERY SURFACE GRINDER



**\$35.00**

**Diamond**

**\$6.00**

First low cost high precision Angle Dresser on the market. Can be set very accurately with a Protractor. Works underneath the wheel. Large bearing surfaces. Order direct on our 10-Day Money Back Guarantee.

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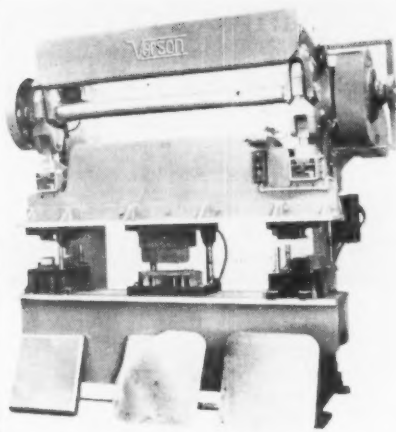


Fig. 1. Standard Verson Intermediate Press Brake equipped with dies for performing the first three operations on ball corners. The first die on the right trims two ball corners on a square sheared brake in four strokes. The center die draws the corner in four strokes, and the die on the left cam trims surplus material from the corners.

• • •

is performed in a second brake equipped with a sectional restrike die. This consists of a pair of master ends and

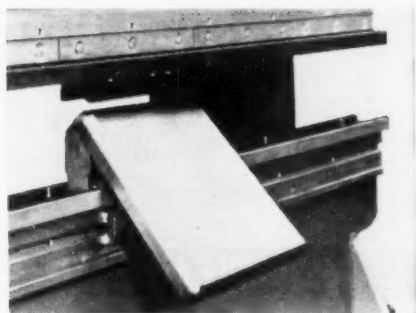


Fig. 2. Press Brake equipped with a restrike die for forming side flanges in the ball corners tool-up. This die consists of a set of master ends which can be expanded any desired distance by placing filler blocks between the ends.

• • •

filler blocks to permit restriking any length within the capacity of the brake.

Thus, a ball corner panel is completed in only two handlings without any special machinery. The tool-up is easily and economically adaptable to a wide variety of sizes although the original investment required is considerably less than for conventional special equipment.

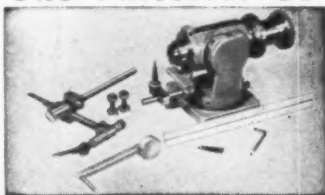
## 7-Station Line Process Machine For V-8 Cylinder Block

This machine, made by LeMaire Tool & Mfg. Co., Dearborn, Mich., consists of 2 main center base sections of rigid welded construction to support 2 columns, the work holding fixtures and index mechanism. Each column supports 2 LeMaire No. 5000 Twin Ram self-contained hydraulic drill units with multiple spindle drill heads, which move on hardened and ground guide bars that keep heads in alignment with fixtures. Two end bases support the loading and unloading mechanism, a bridge type support carries the fixture at idle station No. 4. All drill guide bushings are mounted in the fixture. Transferring of the work, location and

clamping is hydraulically operated. Solenoids are mounted on a control panel shown in illustration. Transferring of the cylinder blocks is by means of a transfer bar with latch type fingers that retract on the bar's return stroke.

Location for the first operating station is by a wedge type locator entering cored opening in the side of block. At this station 2 locating holes are drilled and reamed which are used as final locating points on subsequent operations. Rough location at stations 3, 5, 6 is made by locators entering the same cored opening with final location on 2 reamed locating pins. As the work is carried from station to station, it rides on spring mounted guide blocks

## The Universal CUTTER GRINDING FIXTURE



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**ROCHELEAU TOOL & DIE CO. 650 N. MAIN STREET  
LEOMINSTER, MASS.**

that keep it snugly up against hardened guide bars. After final location the block is locked up against the guide bars. The entire cycle, including transfer, rough locate, final locate, clamp, drilling cycle of head, unclamp, and withdrawal of locators is automatically performed after block has been put in loading station and cycle button has been pressed by machine operator. The hydraulic mechanism operating locators and clamps are shown at the front of each operating station. All hydraulic piping is exposed to provide easy access to all joints.

The valve at the center idle station is a decelerating valve used to bring the transfer bar to a gentle stop. At

the idle station is an air jet to blow chips from deep holes drilled at first operating station. Provision is made for easy removal of chips thru chutes at the rear of the machine. The guide bars and all operating parts of the fixture are automatically lubricated by Bijur system. Each unit has push button control at front of fixtures to assist in setting up machine. Operations Performed:

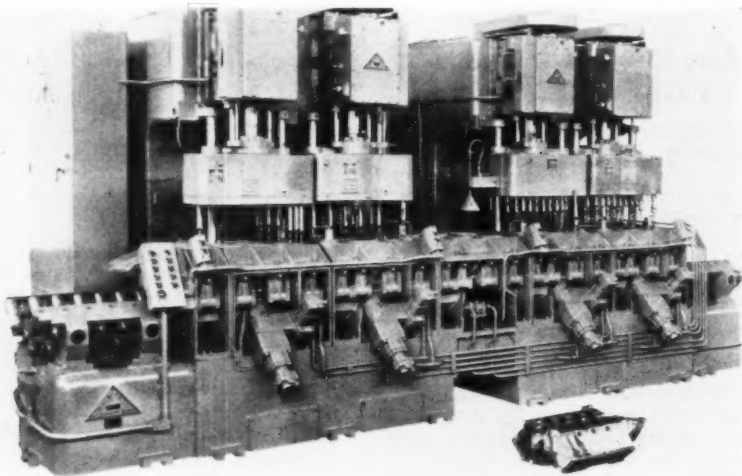
Sta. No. 1—Load.

Sta. No. 2—Drill 9 holes (2 locating holes drilled and reamed).

Sta. No. 3—Drill 16 holes—Chamfer 1 hole.

Sta. No. 4—Idle.

Sta. No. 5—Drill 27 holes.



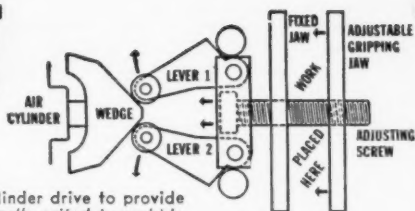
# AIRLOX

## PNEUMATIC VISES

five senior models —

50-200 ti. air-line pressure.

Pat'd wedge-&-lever action utilizes total cylinder drive to provide positive rigid grip on the work • Exceptionally suited to carbide milling. Write for data sheets.



**production devices, inc.**

Whitehall, New York

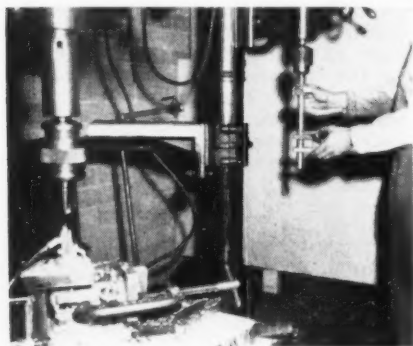
Sta. No. 6—Counterbore 10 holes—  
chamfer 28 holes—Ream 1 hole.

Sta. No. 7—Unload.

Production: approximately (72) pieces  
per hour at 100% efficiency.

### Job Shop Cuts Deburring Cost

A jobbing shop producing parts for  
a prominent agricultural equipment



manufacturer line drills a large hole  
through projecting double ears on a  
cast steel head for a hydraulic cylinder.  
The burrs created in this drilling operation  
must be removed before the  
assembling procedure.

Normally this deburring job might  
be left to a final finishing operation.  
Instead, both drilling and deburring  
are accomplished in the time otherwise  
required for the drilling run only. A  
Nobur tool made by Nobur Mfg. Co.,  
717 No. Victory Blvd., Burbank, Cal.,  
is used in a drill spindle set up next  
to the power drilling operation. While  
the power drilling is under way, the  
operator chamfers the four burr-edged  
edges on the previously drilled part.  
No extra time or labor cost is involved  
and the Noburred parts are more easily  
handled during the balance of the production  
process.

### Special Drum-type Machine Performs 22 Operations

A machine recently developed for an

**HAND-QUICK**

**DRILL JIG**

**MIKRO-MARKER**

**MIKRO-VISE**

**AIR-QUICK**

**DRILL JIG**

**MIKRO TOOLS**  
by Metal Items  
are precision  
made and of  
highest quality.

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820 SIXTH ST. • RACINE, WISCONSIN

automotive manufacturer is an excellent example of the stress placed on cost-cutting machine tools. Twenty-two operations on a water pump body

reaming, facing, boring, chamfering, and hollow milling. In this process twelve holes and four surfaces are machined. With such a combination of



are combined by using two opposed hydraulic units with special heads and seventeen station 27" indexing drum. The machine was made by Barnes Drill Co., 852 Chestnut Ave., Rockford, Ill.

One head is arranged with 25 spindles and the other with 5 spindles. The unit with the 25 spindle head is powered by a 25 h.p. driving motor and 3 h.p. hydraulic motor. The unit with 5 spindle head is powered by a 15 h.p. driving motor and 2 h.p. hydraulic motor.

The operations consist of drilling,

operations the handling of the processed pieces are held to a minimum. In fact, this machine is performing the operations previously done on three special machines—with a proportionate reduction in handling, power, and maintenance costs. Also a reduction in floor space is realized. The production on this machine exceeds 90 pieces per hour at 80% efficiency.

The controls are carefully interlocked to provide the maximum safety—even to the point of the fixture locking wrench which must be positioned in the holder before the machine will operate.

## **Conner** Tool & Cutter Co.

CONSULTANTS - DESIGNERS - TOOLMAKERS - DRILLERS

*Deep Holes—Exclusively*

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## Shop Hints

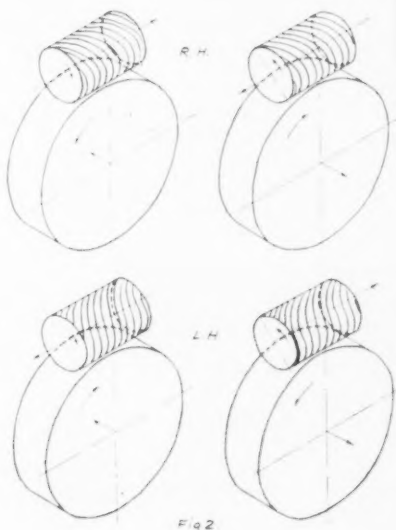
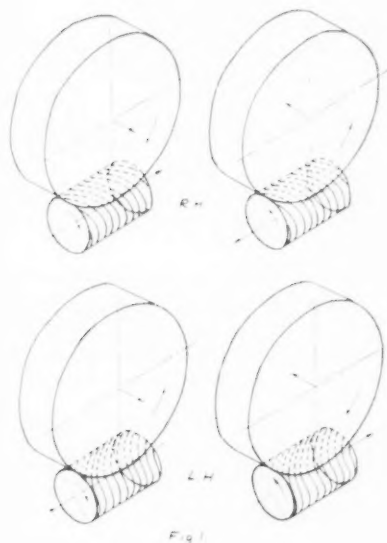
### SIMPLIFYING WORM GEAR DESIGN

H. F. Williams

In a past issue of the BLUE BOOK, a right and left hand threaded screw and nut was used to determine direction of rotation of worms and gears. This article with two sets of drawings is a further elucidation on the subject but in these diagrams the direction of thrust loads are also illustrated. In both instances it should be clearly understood that the thrust arrows represent the actual

thrust, not the thrust reactions. If thrust reactions are only to be considered by the reader, then all directional arrows relative only to thrust must be reversed. To make this clear, the thrust bearing will be positioned on the side in which the arrow points.

As stated in the previous article, there are eight possible positions which a worm and worm gear may assume. In figure 1 the worm is at the bottom for both right and left hand threaded worms and shows the worm rotating



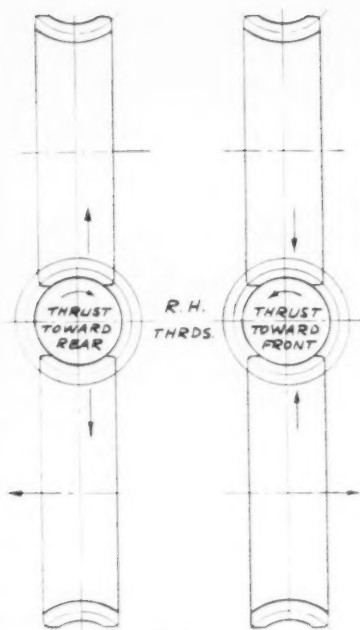


Fig. 3

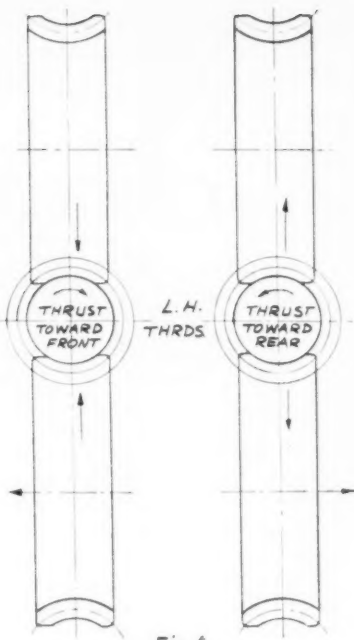


Fig. 4

both clockwise and counter-clockwise. The same is true in Figure 2 except that the worm is placed above the worm gear.

If the reader finds it misleading to read an isometric drawing as in the preceeding figures, then Figure 3 and 4 show another method of showing direction of rotations and thrust load

directions for worm and worm gears. The grouping is slightly different from that shown in Figures 1 and 2 in that one four worms are shown for the eight positions of worm gears. This of course does not alter any of the characteristics. The arrows pointing upwards on the worm gears signify clockwise rotations, while the ones



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It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in  $\frac{1}{8}$ " to 1" diameters. Send for pricelist.

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332 Lincoln Ave.

Urbana, Ohio



pointing downwards mean that the gears run counter-clockwise. The notation "thrust toward front" means that the thrust load is being exerted toward the reader and this is where the thrust bearing is to be placed. "Thrust toward rear" means of course that the load is away from the reader. The thrust arrows for the worm gears indicate on which side the thrust bearing is applied.

If either or both of these sets of sketches is filed in the machine designer's loose-leaf scrap book or tucked away in the machinists tool chest, they will afford a ready reference for the determination of worm and worm gear rotations and thrusts.

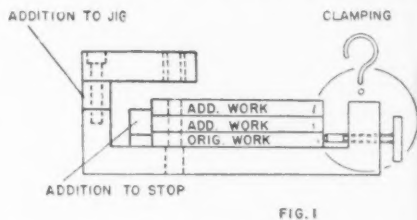
### To Prevent Tool Slippage

To prevent tools from slipping past the face grinding wheels and possibly injuring the operator's fingers, William Wolter, grinder hand at Allis-Chalmers Manufacturing Co., Milwaukee, Wis.,

hit upon the idea of bolting four blocks on the tilting tables. Blocks used are approximately 4 inches long, one inch wide and one-half inch high. Each is held in place with two flat head cap screws.

### Multiple Clamping Made Simple

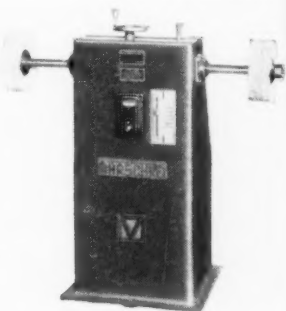
It is often desirable to convert a "single-piece" drill jig into one which drills several stacked parts at once, Fig. 1, as savings of time can be achieved



by reducing handling time. In cases where the work piece is a plate, clamped against locators, the change-over is quite simple although it now

## A MARSCHKE BUFFER TAILORED TO YOU

Goes without saying, it matters little which Marschke you select, from the standpoint of quality; a narrow one with only two bearings, or a wider one with four bearings, you'll find a stiff, true-running spindle. The big point is: your ability to choose a Marschke to fit your needs EXACTLY. Marschkes come in a wide range of specifications: pedestal and floor stand types (as shown here), single and double end, 1 HP to 30



HP, direct or belt drive, with or without variable speed control, for wheels or for abrasive belts.

YOU tell us the problem, we'll bet we have a Marschke to fit it exactly.

**VONNEGUT**  
**MOULDER CORPORATION**

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becomes necessary to use multiple clamping. Just adding more clamps would defeat the purpose as the operator would have to repeat the clamping operation once or twice. To prevent such unnecessary loss of time, the clamping must be designed in such a way that one clamp will fasten two or more pieces. An equalizing clamp as shown in Fig. 2 can easily be made by connecting two pins through a bar,

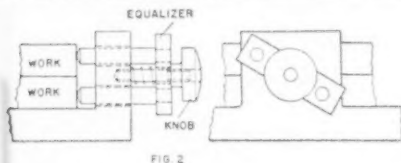


FIG. 2

which is activated by a hand knob turning on a stud. The stud is fastened into the upright jig member and carries a spring for automatic return of the equalizing bar. Care must be taken to make the two holes guiding the clamping pins, as well as the clearance hole for the stud, large enough to

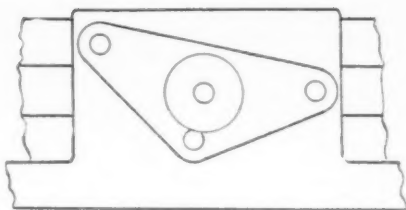


FIG. 3

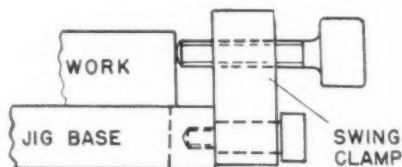


FIG. 4

allow true equalization, that is, compensation for any variation of the width of the work pieces. The same principle may be used to clamp three pieces at

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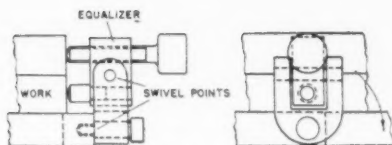


FIG. 5

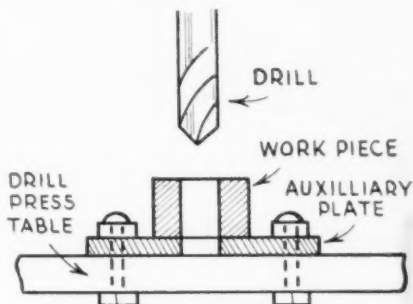
once and is shown in Fig. 3. Sometimes, a drill jig is equipped with a clamp as shown in Fig. 4, which may be swung out of the way to facilitate removal of the work. This clamp too, can be replaced by an equalizing clamp, which will clamp two pieces at once and Fig. 5 shows the simple solution.  
**H. G. Frommer**

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Holes produced in metal blocks usually have a burr around them after the drill is withdrawn; and the thinner and softer the material the greater the burr.

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thick, securely to the table of the drill. With the original drill, well centered, drill a hole through the iron plate. After that begin to drill the work pieces.



There will be no burrs. Explanation for this is: the auxiliary plate with its central hole serves as a well-centered die.

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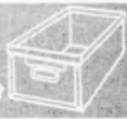
Drawing shows how top and bottom frames are bolted to uprights. Racks are shipped knocked-down.

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## Foremanship Forum

### LET YOUR ACTIONS TALK

#### Public Speaking for Foremen. Part 2

by Ed Mottershead

For the foreman who is interested in becoming an effective speaker, one thing may seem a little strange at first: actions speak as loudly as words. How you stand, what you do with your face and your body conveys a large amount of your real meaning to your listeners.

Have you ever sat in an audience and wondered why the speaker seemed so marvelously in command of the situation, why everybody seemed to like him; and then sat in another where the audience was listless and not very much interested? The answer is audience appeal. What is AUDIENCE APPEAL? Overstreet says, "Like begets like. Smile, and people will smile back." Act friendly and you will soon have a friendly reception. A speaker before an audience has much the same job as a young man courting a lady. He must make her like him. First impressions are lasting. In public speaking, first impressions can make or break your talk.

Rule One for Audience Appeal: SMILE.

"Contact." It was successfully maintained contact in a motor that got

Lindbergh across to his destination in 1927. Direct personal CONTACT between you and your listeners is necessary for your message to "get across." Personal contact means EYE CONTACT. Look your listeners directly in the eyes. Look at all of them. Look at them individually. Look at them all of the time. And actually SEE them.

Rule Two for Audience Appeal: EYE CONTACT.

Have you ever noticed how some speakers were always bulging at odd corners, pockets abused like an overstuffed briefcase, pants lacking a pressed crease, tie askew, hair mussed? And have you also noticed how some speakers are always smooth and finished in appearance, always well turned out? And have you felt the difference?

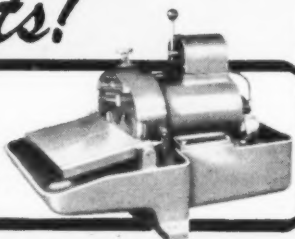
Rule Three for Audience Appeal: PERSONAL APPEARANCE.

Perhaps you are one of those speakers who hurry up to the platform and begin your "Ladies and Gentlemen..." even before you have arrived upon the stage. The audience is still unsettled; the chairman has barely finished introducing you; nothing is really

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ready. Yet you are already into your third or even fourth sentence by the time that the audience is quiet and you really have attention. Yet, your first sentence may be the most important one in your talk!

You have watched a good speaker approach the platform, calmly, slowly, with dignity. You have seen him stand quietly, saying nothing, surveying the situation, looking into his listeners' eyes. And when he does begin to speak, he has attention. He has paused before he began. That's all. Nothing difficult,

nothing mysterious. Nothing that get attention faster (in a reasonable audience situation) than dead silence. You good speaker waits for silence and attention before he begins.

Rule Four for Audience Appeal  
**WAIT FOR ATTENTION.**

We have an emotional reaction to the appearance of things. If they are dowdy or sloppy or out of balance or awkward, we react negatively. Subconsciously we sense that something is wrong. Maybe we don't realize just what is the matter, but something is



# THE FIRST NEW IDEA IN DRILL JIG BUSHINGS...



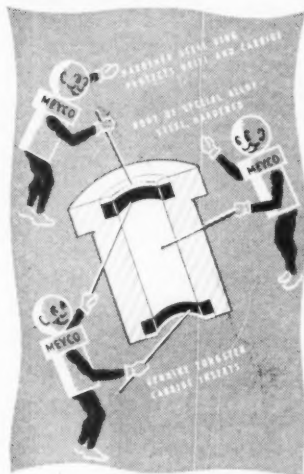
SINCE  
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SAVE money 7 ways:

Talk about "earning their keep," look at the ways Meyco Carbide Inserted Drill Jig Bushings will save production costs: (1) Last longer . . . with a life—in most cases—as long as solid carbide bushings at prices that come close to the prices of ordinary steel bushings; (2) Increased life for your drill jigs and fixtures; (3) Increased life for your drills and reamers; (4) Accuracy maintained for a LONG PERIOD of time; (5) Less non-productive machine time, less lost man hours, because bushings need not be changed as often; (6) Inspection time saved, because of greater accuracy for a longer time; and (7) Less waste due to spoilage, for the same reason. **MOTORMAKER SAYS:** "High-Speed steel bushings averaged ten days' life, MEYCO bushings, after three months' use, show no signs of wear."



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**W. F. MEYERS CO., INC., BEDFORD, INDIANA**

ut of kilter, and it gives us an uncomfortable feeling.

The presence of this force, called empathy, in the psychological make-up of audiences makes it necessary for the speaker to have proper control of his body, proper balance, footwork, posture. For proper management of our body in action you need,

Principle One: **EMPATHY.**

Have you ever watched the feet of the other fellow when you were talking to him? Did he squirm, stand still, or teeter? And didn't that give you

some clue to his mental attitude quite apart from what the rest of him was doing?

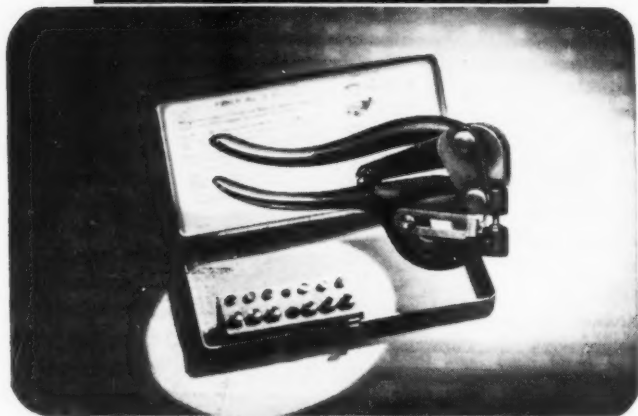
In boxing, tennis, dancing, and many other sports one thing plays a part of prime importance: footwork. And this holds true in public speaking. Your footwork is the basis of body balance, the basis of effectively handling yourself while speaking before people.

The great problem in learning to speak effectively is to learn control of the entire body in such a way as to be able to have your body say one

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thing at a time, and not several conflicting things.

The purpose of the study of posture, movement, and gesture is NOT to make one's self conspicuous before others, but to learn how to use the entire body as an instrument of speech. Entering into the spirit of what you are saying will help you to use all of your powers; conversely, using all of your powers will help you to enter into the spirit of what you say. The ultimate aim is to develop the ability to use your whole body effectively and un-

consciously to support what you say.

To be convincing, you must express yourself from the inside . . . out. Do not start with the gestures, with posture, but rather with the state of your own mind, your ideas. Think through your message until you are suffused with it; feel it sincerely; reveal it through your body, poise, posture, gesture, facial expression . . . by having all physical expression work in unity.

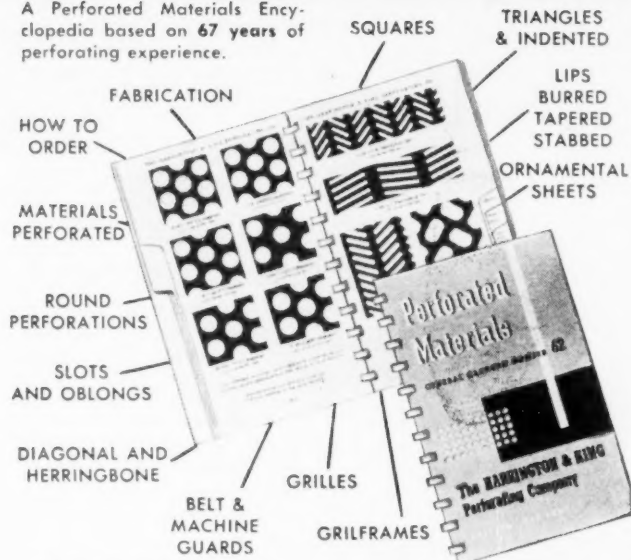
As an exercise, stand before a mirror and make your posture say: "I am a great guy." "I am tired." "I am alert."

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## Where to use Perforated Material

## Why H & K Perforated Material?

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I am timid." "I am discouraged." Notice that to have your posture really express these attitudes, you have to sink, and then feel them. The essential point is that we have each of us more or less habitual indifferent control of our body . . . so that it does not say the same thing our words do! Train it to be appropriate.

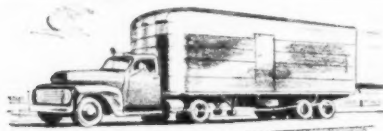
Principle Three: APPROPRIATE POSTURE.

Some years ago I studied voice. Some days I sang well, and he would only bawl me out a little. Some days

I sang dully, without animation, without the "ring" of the bel canto, and he would shout: "Vitalize! VITALIZE!" Vitamins, breakfast foods, laxatives, dentifrices and cosmetics are sold on the same slogan: "Get PEP." "Be VITAL." Feel ALIVE."

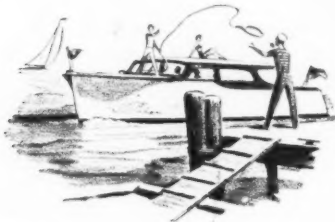
Many inexperienced speakers, and some experienced ones too, seem to feel that the simple fact of their presence on the platform is enough; that they have condescended to speak before us is sufficient. We shouldn't expect them to energize and be alive.

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Some speakers with very fine ideas and a great deal of sincerity still stand before us in a lumpish attitude, anything but vital.

#### Principle Four: VITALIZE.

Gestures are used to vitalize, to enforce, to illuminate ideas. Good gestures do not call attention to themselves, but to the idea they help express; they must blend in with every other means of expression. A gesture is as personal as your toothbrush, and must truly represent you or the character you are portraying.

There are three general types of gestures, corresponding roughly to the three basic gesture impulses to be observed in infants. The baby will gesture either because he wants something, because he does not want it or in an unconscious attempt to dominate his environment. Thus we have emphatic gestures, descriptive gestures, and suggestive gestures.

The emphatic gestures, such as slapping the hands together, shaking your head, pounding on the table, shaking your fist, stamping your foot, and the

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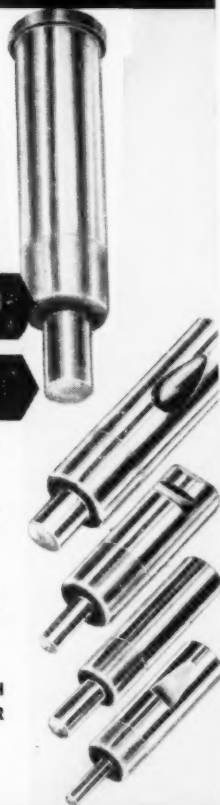
\*Reg. U. S. Pat. Off.



**PIVOT PUNCH AND DIE CORPORATION**

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NORTH TONAWANDA, N. Y.



rest, are not only characterized by considerable vigor of execution, but are intended to draw particular attention to what is being said. These gestures are interpreted by most listeners to mean that you are very much in earnest about what you are saying at the moment, and want them particularly to accept or remember the ideas that accompany these movements.

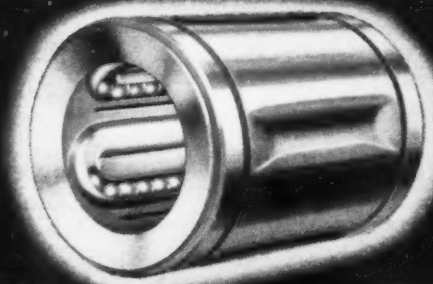
Descriptive gestures, which you use to help the audience visualize the size or shape or location of objects or their

relative position, to make clear the distinctions between contrasts or between separate divisions of your talk, also have a wide range of physical activity. However, they do not usually reach the extremes of vigorous execution. They are essentially the symbols of emotions and ideas you wish to convey. Many times suggestive gestures are enlarged to pantomimes or impersonations for a moment long enough to convey the idea.

Naturally, such a break-down as

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PROGRESSIVE MANUFACTURERS USE BALL BUSHINGS—A MAJOR IMPROVEMENT AT A MINOR COST

this is made purely for descriptive purposes. In practice, the three types often blend into each other, just as a right hand gesture may combine with a bodily movement and a facial expression to support the words you are using in a complete unity of expression. The whole thing eventually becomes a semi-conscious and spontaneous process.

As an exercise, stand before a fairly large mirror, first watching your posture to see that it means what you want it to, and then as spontaneously

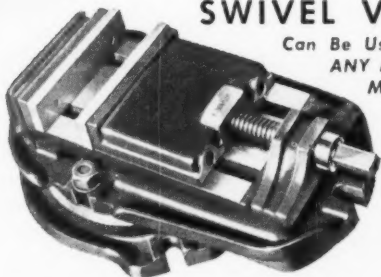
as you can, gesture to express the following. "On the one hand we have a great character, and on the other hand, an ignominious failure." "I will have no part of it. None!" "Give me five minutes of your time, and I will tell you what you want to know." "Take that dirty thing out of here!" "Wait! Stop and consider a moment. What has this man to offer? Something that we really want? Something we can really use? No!" Go on from here just talking to yourself for a while . . . . .



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Take a couple of minutes each day before a mirror and make a few gestures just for the feel of the thing. Watch your movements and see which are pleasing to you. You are your own best critic. For effective use of gesture:

#### Step One: PRACTICE.

Have you ever had someone give you a "dead-fish" handshake? Probably all of us have had it happen. And what was your reaction, distaste at least. Gestures can be the same way. They can be "dead fish" or live hands,

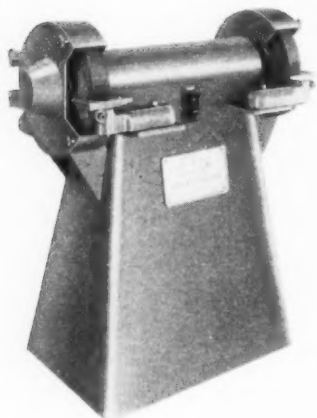
hands that mean what they say. In making good gestures:

#### Step Two: MAKE THEM LIVE.

How would you feel if I walked quietly up to you, raised my fist over my head, and said in a very quiet voice, "Please leave me alone, please." Sounds a bit ludicrous, doesn't it? Can you imagine Patrick Henry saying, "Give me liberty, or give me death!" without making a big force gesture of some kind? Neither can I. When you have an idea to express, and when you want a gesture to

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make it emphatic, use an appropriate gesture.

Step Three: **MAKE THEM APPROPRIATE.**

Did you ever watch a high school declamation contest? I have. And did you feel sorry for those youngsters, some of them, who appeared more pitiful than comic in their planned and forced gesticulations? I did. A gesture can be properly made; it can be alive; and it can be appropriate. But if it is not sincere, if it is not spontaneous, it defeats its purpose.

Step Four: **BE SPONTANEOUS.**

In talking about your body in action we have proceeded from the large to the small, from the simple to the relatively complex.

The first thing your audience notices about you is your personal appearance, your dress, posture, animation. The next thing they observe in your physical delivery is your use of gesture. And then they become aware of facial expression. There are two things to keep in mind: **FRIENDLINESS**, and **ANIMATION**.

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With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counter-boring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon—high chrome steels of any degree of hardness.

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These two basic principles will carry you through provided you have a message motivated by your personal experience, and provided you let your sincerity shine in your delivery.

The eyes have often been called "the windows of the soul." They are a powerful means of expression, affirming or denying what you say with your body and words. They often express thoughts and feelings which cannot be put into word. The most delicate tissues and muscles of the face are those around the eyes. Thus it is not

the eye itself, but rather those muscles and tissues, which express your emotions. Entirely apart from "eye contact" with your listeners, your eyes have a big job to do. For exercise, make your eyes say: "I'm afraid." "I'm amazed." "I'm angry." "I really mean this." "I'm tired." "I'm sorry."

Your second most expressive feature is your mouth. No wonder, for the lower jaw is just hanging by ligaments and muscles attached to your head, and your lips have full play across its widest opening. The important thing

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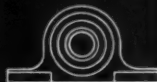
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**Yes!**—all items illustrated on this page, and many other items not illustrated, are Standard Stock ready for immediate shipment to you. **YOU SAVE—TIME . . . MONEY . . .** when you use Chicago Stock Parts. No dies to build . . . No stock to carry.

For complete information write for catalog No. 50A



Shaft Collars



Flexible Couplings



Miter Gears



Hand Wheels



Manufactured by  
**Chicago DIE CASTING MFG. CO.**

2515-17 West Monroe Street  
Chicago 12, Illinois



is not only to avoid a fixed grin or a fixed slit of a mouth when speaking, or to avoid some mannerism such as talking out of the corner of your mouth, but to make it express the emotions you feel while you are speaking. As an exercise, make your mouth say: "I'm severe." "I'm just a boob." "I'm friendly." "I'm sorry." "I'm disappointed." "I'm angry."

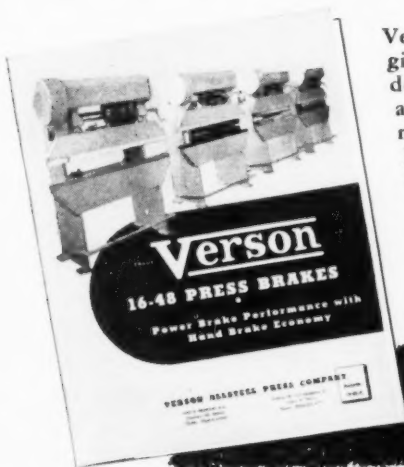
Your face is constantly saying something; see that it says what you want it to say! How? There are three things you can do to develop this ability:

1. Limber up your facial muscles

daily through exercising them. Stretch and relax them. Open your mouth as far as it will go and then let it relax and shut. Repeat. Shut your mouth tightly and then relax and let it drop open. Smile as widely as you can, stretching the corners of your mouth; then relax and let it shut. Close your eyes tightly; squeeze them shut, relax and let them open. Open them wide, stretch, relax them and let them almost close. You can go on from here with every facial muscle you can find.

2. Read aloud daily passages of prose or poetry, drama, or tongue twisters. First read through your selection ex-

# Here's your guide to lower metal forming costs on smaller jobs



Verson Bulletin 16-48A gives complete design details, specifications and capacities for the new Verson 16-48 Press Brake — the machine that gives you big brake design at small brake cost. Write for your copy today!

## VERSON ALLSTEEL PRESS CO.

9303 S. Kenwood Ave.  
CHICAGO 19, ILLINOIS

Holmes St. and Ledbetter Dr.  
DALLAS 8, TEXAS

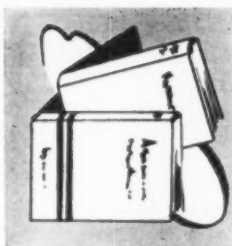
**THERE'S A VERSION PRESS BRAKE FOR EVERY JOB  
FROM 15 TONS UP!**

aggerating every syllable, exaggerating the movement of lips, tongue, teeth, jaw, eyes, mouth. Then read through it aloud, the way you really mean to say it. Pick something that stirs your imagination and gives you a chance to get a sincere emotion going.

3. Work in front of a mirror to check yourself for sincerity, genuineness. Don't put in dramatic effects where none are required, and don't do dead-pan when you need to show real feeling. If you are honest with

yourself, your mirror will let you know if and when you are showing genuine feeling.

You may be genuinely interested, deeply appreciative, highly amused, sincerely sympathetic, or possess any of dozens of other feelings. But unless your facial expression shows it, your face lies about you, and the listener does not know what you really mean to convey. The value of a sensitive, expressive face far outweighs the value of so-called "good looks," for it will hold the attention of an audience, public or private, indefinitely.



## Available Literature

1. **Thread and Form Rolling**, the process, application and equipment, is a new 16-page, 2-color bulletin just issued. It contains a wide, general approach to the problem of rolled threads, their accuracy, uniformity, time-saving characteristics, and versatility. Well-illustrated, intelligently edited. Bulletin No. 5-2 available upon request to **Reed Rolled Thread Die Co.**, 237 Chandler St., Worcester 2, Mass.

2. **National Sturdy Drills** of high speed steel for tool rooms, repair and maintenance men and mechanics; National wood boring drills for home workshops and construction; four new National drill sets are offered in an attractive, 2-color, 8-page booklet just issued by **National Twist Drill & Tool Co.**, Rochester, Mich.

3. **Aro Air Tools**, including screw drivers and nut setters embracing a full range of sizes and speeds from 450 to 2400 r.p.m. are illustrated with descriptions in a 4-page form No. 1265T recently issued and available upon request to **The Aro Equipment Corporation**, Bryan, Ohio.

4. **Machine Tool Conduit**, an illustrated bulletin just released gives full description of the highly flexible conduit made of galvanized steel, convoluted tubing and covered with polyvinyl plastic. The conduit is suitable for protecting electrical wiring on machine tools and other applications requiring resistance to moisture, coolants, greases and oils. Bulletin CMH-108 available from **Chicago Metal Hose Corp.**, Maywood, Ill.

5. **Automatic Checking Recorder**, a 2-page technical bulletin (MTR-50) contains photographs and text which illustrate the major features and controls of the recorder which incorporates an all-electric chart drive for increased accuracy in making permanent chart rec-

ords of involute tooth forms, tooth spacing, leads, contours, diameters, etc. **Michigan Tool Co.**, 7171 E. McNichols Road, Detroit 12, Mich.

6. **Skinner Solenoid Valves**, a 6-page bulletin containing complete details on the V-5, M-2 and M-3 series of Solenoid Valves; this Stock Valve List No. 505 includes all necessary pressure and orifice information, with prices, for a wide variety of types of Skinner Solenoid valves. Bulletin available upon request from **Skinner Electric Valve Division, The Skinner Chuck Co.**, Norwalk, Conn.

7. **Lindberg Air Cylinders**, featuring a one-piece piston with synthetic "vee" packings which snap into the piston groove, are shown in a 2-color, 8½" x 11" Bulletin, No. 731, just issued. Multiple position cylinder ports and absence of tie-rods are among the design features; eleven bore sizes, from 2" to 12". Bulletin available upon request to **Lindberg Engineering Co., Air and Hydraulic Division**, 242 W. Hubbard St., Chicago 12, Ill.

8. **How to Simplify** (1) Tool Room Work (2) General Purpose Milling (3) Production Machining with Sundstrand Magnetic Power-Grip Chucks, a new booklet illustrates the wide application of these ingenious devices in a wide variety of uses. Illustrated, 16-page Booklet, No. MC-1 is available upon request from **Sundstrand Magnetic Products Co.**, 1306 18th Ave., Rockford, Ill.

9. **Detroit Power Screwdrivers** including fixtures, hopper units, nut drivers, and special (assembly) machines are illustrated and described in detail in a new catalog which gives complete information on the types and speeds recommended for particular jobs. New catalog available upon request. **Detroit Power Screwdriver Co.**, 2809 W. Fort St., Detroit 16, Mich.



**Leading  
the  
Field**



## **RUTHMAN GUSHER MACHINE TOOL COOLANT PUMPS**

**LEADERS** in their field, Ruthman Gusher Coolant Pumps are: economical, low in initial cost, low in maintenance cost, easier to install, use less power when throttled; efficient, give you split-second control of coolant, require no packing and priming; trouble-free, are simply constructed, have dynamically balanced rotating parts for minimum vibration, and heavy-duty, pre-lubricated ball bearings for lower maintenance cost.



WRITE FOR OUR COMPLETE CATALOG

**THE RUTHMAN  
MACHINERY CO.**

1816 Reading Road

Cincinnati 2, Ohio

1. Standard and Special Carbide Tools. The 1950 catalog of Super Tool Co., contains 64 pages of illustrations, specifications and charts covering the manufacturer's line; divided into six sections, including milling cutters, reamers, drills, projector type tools, standard tools, and miscellaneous tools. Catalog No. 50 available upon request. Super Tool Co., 21650 Hoover Road, Detroit 13, Mich.

1. Metal Cutting Snips, a 6-page, 2-color, illustrated bulletin gives complete data on manufacture, operation, accuracy, plus page of selling suggestions for these

useful tools. Bulletin is available upon request to J. Wiss & Sons Co., Newark 7, N. J.

12. Drill Chip Breaker for faster drilling, better and deeper holes, longer drill life, reductions in drilling costs, is stated to increase production by 100%, while reducing rejects. Various advantages and complete data are given in a 4-page, illustrated Bulletin DCB-10, available upon request to Commander Manufacturing Co., 4227 W. Kinzie St., Chicago 24, Ill.

13. Professional Foundry Engineering, a

## Severance CHATTERLESS TOOLS HIGH SPEED CARBIDE



Winning their way on job after job, they are carefully designed to preclude chatter and can be depended on to produce superior finishes.

### Severance CHATTERLESS COUNTERSINKS

#### STANDARD TYPE —

Stocked in 13 diameters up to 2" and in 30°, 41°, 45°, and 60° angles (with C/L).

Sizes 1" and larger stocked also threaded for shanks — tapered or straight — in various sizes.

Use CARBIDE for tough jobs or high production.

#### HEAVY DUTY TYPE —

Features larger shanks having a tang drive.

Full range of sizes and angles.



HEADQUARTERS FOR COUNTERSINKS, REAMERS, SEATING TOOLS, and SPOTFACERS that preclude chatter.

### Severance CHATTERLESS BALL SEAT REAMERS



Standard and Heavy Duty Types  
8 sizes each.

Made also for shaped cavities — as ordered.

#### BALL NOSE DRILLS —

In corresponding sizes hog out the stock for Ball Seat Reamers.



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- Faster cutting
- Better finishing
- Shear-cut teeth

Tapers up to 15° quickly supplied from stock — up to 1½" diameter x 2¼" long.

Unexcelled for holes having keyways, ports, splines, cross holes, etc.

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**Severance Tool Industries, Inc.**

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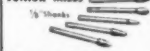
Saginaw, Mich.

#### MIDGET MILL GROUP

##### MIDGET MILLS



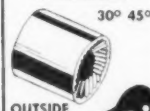
##### JUNIOR MILLS



##### LAD MILLS



#### DEBURRING GROUP



#### TUBING GROUP

##### STANDARD Chamfering



##### SOLID (For Radius Lip)

12-page booklet containing suggestions for plant survey, foundry layout, architectural planning, foundry modernization and management, production and cost control. Just completed and available upon request to **Lester B. Knight & Associates, Inc.**, 600 W. Jackson Blvd., Chicago 6, Ill.

14. **Putnam Postiv-Lok End Mills** for higher tool economies on large boring mills, profiling machines and similar applications are offered in a 4-page, 2-color bulletin; end mills, 2-flute end mills, end mill holders, standard and shell end mill

adapters are included. Bulletin available upon request to **Putnam Tool Co.**, 2981 Charlevoix Ave., Detroit 7, Mich.

15. **New 85-Ton Press-Rite Power Press**, open back inclinable type with built-in tie rods is introduced in new bulletin containing general description of the machine's features, complete specification table and illustration; all pertinent data, both technical and general are covered in this bulletin which is available upon request to **Sales Service Machine Tool Co.**, 2357 University Ave., St. Paul, Minn.

16. **Running a Regal**, a 90-page, 8½" x 11"

# For Greater Operating Angle *Specify* LOVEJOY Universal Joints

Provide maximum bearing surface and strength at greater operating angle than any other universal joint. Rivets ground flush with body for close work. Precision-ground of heat-treated alloy steel to .0005 concentricity.

Write for full details and valuable universal joint data.



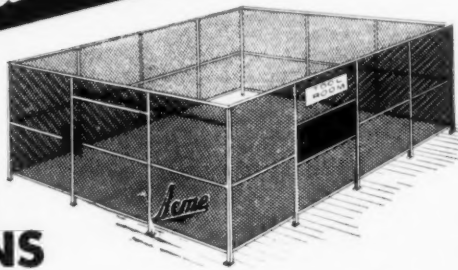
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14 SIZES  
Diameters  
3/8" to 4"  
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Also Mfrs. of Lovejoy Flexible Couplings and Lovejoy Variable Speed Transmissions

*Leaders for 50 Years*  
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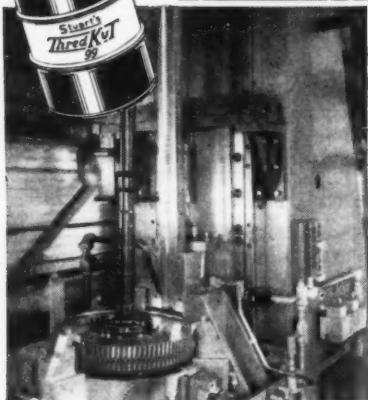


Standard Sections Woven Wire Mesh Panels and Doors to enclose Tool Cribs, Stock rooms and other enclosures.

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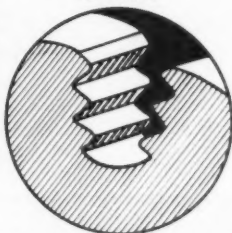
**Acme Wire & Iron Works**  
3519 E. Canfield — Detroit 7, Mich.



Photograph Courtesy The Lapointe Machine Tool Company.  
Inset. Sketch of "pine tree" slot broached in jet engine disc.

## "ThredKut 99

Smooths out  
tough  
**"PINE TREE"**  
Broaching  
Job!



HERE is one of the most difficult broaching jobs that the metal-working industry has ever tackled and solved — cutting the "pine tree" shaped slot in exceptionally tough alloy steel jet engine discs.

Stuart's THREDKUT 99 has rendered outstanding service for leading manufacturers in this field. Its combination of high anti-weld and high lubricity characteristics proved to be a 100% satisfactory solution to difficulties of this job.

What is your broaching job? The toughest ones can be handled better, and the easy ones are easier with the right Stuart products! Ask for Stuart's pamphlet OILS FOR BROACHING or call your nearby Stuart representative.

**D. A. Stuart Oil co.**  
EST. 1915 LIMITED

2749 So. Troy St.

Chicago 23, Illinois

instruction manual describing the construction, operation and maintenance of the LeBlond Regal geared head engine lathe. This useful book, the 14th edition of its type, contains an exploded parts section for greater ease and speed in ordering repair parts. It is available at 50c from The R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio.

**17. Master Socket Set Screws** of high tensile strength and uniformity, for the simplification of assembly problems, are described in a 2-color folder containing application information on various types

of screw products. Special and standard types of socket, head cap, and other screws are mentioned. Request Bulletin 483 from Hartford Machine Screw Co., Hartford, Conn.

**18. Helpful Hints** on Macklin Grinding Wheels, a useful 64-page booklet prepared to be of use to grinding machine operators, contains a wealth of pertinent information on the subject, including safety hints, cost-lowering suggestions, wheel recommendations, selections, etc. Available from Macklin Company, Jackson, Mich.



**Procunier High Speed Tap Heads are available in 4 sizes with capacities from No. 0 to 1 1/8".**

**Small size for easier tapping close to walls or shoulders. Lighter, smaller in diameter.**

## ***Saving taps... cutting costs...*** **—for over 30 years!**

PROCUNIER HIGH SPEED TAP HEADS have been keeping production costs down — doing fast, precision tapping with fewer broken taps . . . for more than 30 years! Today, improved Procunier tap heads have more features, than ever before, including the sensitive friction clutch; heat treated gear mechanism for long, trouble-free mechanical life; ball bearings for lifetime accuracy; a simple, one-hole lubrication system . . . as well as many others.

Investigate PROCUNIER — the tapping heads that have set the standards for over 30 years. WRITE TODAY for illustrated brochure giving complete details, specifications and prices.

### **PROCUNIER SAFETY CHUCK CO.**

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Gentlemen:

Please send full details about improved Procunier high speed tapping equipment.

Name .....

Address .....

City .....

Zone ..... State .....

19. Cushman Power Wrench reduces operator fatigue, speeds production on multi-spindle machines; its design and application are covered in a 6-page, 2-color bulletin containing illustrations, blow-ups of construction details and general specifications. Request Bulletin No. 211D from The Cushman Chuck Co., Hartford 2, Conn.

20. Blue Helix Reamers, both straight or taper shank types, are reviewed in a 4-page, 3-color circular recently issued. Illustrations, specifications, design sizes and uses, accompanied by a table cover-

ing sizes from 3 1/2" to 12 1/2" are included. Request Circular No. 427-4 from Pratt & Whitney, Div. Niles-Bement-Pond Co., West Hartford 1, Conn.

21. Zagar Keyway Broaches are discussed in a new bulletin containing machine standards, sizes and other pertinent data of interest to operators of broaching machines; detailed specifications of the 20" and 36" stroke machines are furnished on accompanying data sheets, including sketches and illustrations. Ask for Bulletin No. 505. Zagar Tool, Inc., 23880 Lakeland Blvd., Cleveland 23, Ohio.

## INSTANT ACTION RAPIDSET by HARTMANN

All Purpose Tool Room and  
Machine Shop Vises.

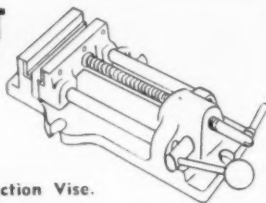


## The JAWSET

Adjustable Pressure Production Vise.

For Information Write Dept. M

Hartmann Mfg. Co., 1637 Goold St., Racine, Wisconsin



22. JVG Gas-Engine-Driven Compressors developed for compactness, flexibility for loading and operation, low-cost installation, easy relocation, quiet performance and economy are offered in three sizes in a new 4-page form. Construction and design features, cutaway drawings and applications are given. Write for Form 3127-A to Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

23. Reed Vises and Pipe Tools are included in a useful 32-page, 8½" x 11" catalog containing detailed specifications of the manufacturer's complete line con-

sisting of machinist's and bench vises, pipe vises, ratchet threader sets, 3-way threaders, solid bolt dies and sets, and many other items. Request Catalog No. 49. Reed Manufacturing Co., Erie, Pa.

24. Universal Cutting Grinding Fixture used on any make of universal tool grinder or surface grinder is described in a 4-page bulletin containing several illustrations giving various applications of the use of this ingenious and useful device. Adequate descriptive material and specifications are included. Request Bulletin 600. Rocheleau Tool & Die Co., Leominster, Mass.

Don't miss this month's special report on Knee-type Milling Machines in another section of this issue.

Previous issues of the MACHINE and TOOL BLUE BOOK featured special reports on Thread Rolling (May), and Power Press Brakes (June). A few reprints of these reports are still available.

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ONE PURCHASE ORDER COVERS ALL MAKES

**DIXON AND RYAN CO.**

311 S. TROY

EST. 1926

ROYAL OAK, MICHIGAN



25. **Annis Dynograph**, a Dynamic Balancing Machine for high speed precision work is given detailed description in a new 4-page, 2-color bulletin containing much information on the comparisons between static and dynamic balancing for various types of work. Machine specifications and illustrations included. Bulletin is available upon request to **R. B. Annis Co.**, 1101 N. Delaware St., Indianapolis 2, Ind.

26. **Furnace Treatment of Cold Drawn Steels** is a handy 14-page pocket guide containing information on steel processing with modern equipment. Various forms of heat treating are discussed, including stress-relieving, normalizing, carbon correction, etc. Form No. ADV-452 is available from **Republic Steel Corp.**, **Union Drawn Steel Division**, Massillon, Ohio.

27. **Universal Iron Bender** with hydraulic attachment is a sturdy, economical, powerful bending device which speeds up the bending of pipe, bar and angle iron on production, maintenance or construction jobs. It is discussed in a new catalog sheet recently issued by **Hossfeld Manufacturing Co.**, Winona, Minn.

28. **Important Shipping Room Operations** are discussed in an illustrated 6-page folder giving the solution to twelve varied shipping room problems; it describes several of the Bostitch machines which are available for top sealing, assembling, bag sealing, tacking, etc. Form PTG-267 available upon request from **Bostitch**, 731 Mechanic St., Westerly, R.I.

29. **Nelson Stud Welding** in the construction industry discusses 11 different applications in the field for guidance of architects, engineers and contractors interested in utilizing this fastening technique. Uses shown include installation of roofing, siding, windows, insulation, electrical equipment, etc. 4-page illustrated folder sent on request to **Nelson Stud Welding Division of Morton Gregory Corp.**, Toledo Ave., and E. 28th St., Lorain, Ohio.

30. **Recording Thermometer Bulletin**, a 44-page catalog containing complete information on the Bristol Company's Series 500 line of thermometers. Liquid-filled, vapor pressure and gas-filled types are discussed for recording, indicating, controlling and telemetering of temperatures. Bulletin T840 is available from **The Bristol Company**, Waterbury 20, Conn.

## DORMAN

### AUTOMATIC REVERSE TAPPERS



- **AUTOMATIC TORQUE CONTROL** . . . One Minute to Adjust . . . Prevents Tap Breakage . . . Operator Need Not Be Skilled
- **WIDE RANGE TAP CAPACITY**
  - No. 1 FRICTION DRIVE TAPPER—capacity No. 2—5/8 to 3/4" in Steel, 1/2" in Aluminum.
  - No. 2B POSITIVE TAPPER—capacity 3/8 to 7/8" in Steel.
  - No. 3A POSITIVE TAPPER—capacity 1/2" to 1 1/4" in Steel, 1/2" to 3/4" Pipe Taps.
  - No. 4A TAPPER—Capacity 3/4" to 2" in Steel including Pipe Taps.

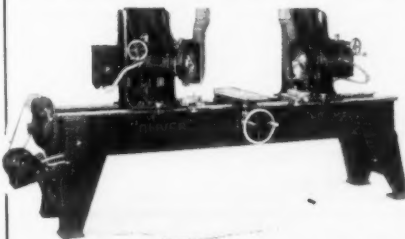
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**THRIFTMASTER PRODUCTS CORPORATION**  
 Division of Thomson Industries, Inc.  
 1030 N. PLUM STREET, LANCASTER, PA.  
 STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

## "OLIVER"

### SEMI-AUTOMATIC Double End Miter Saw

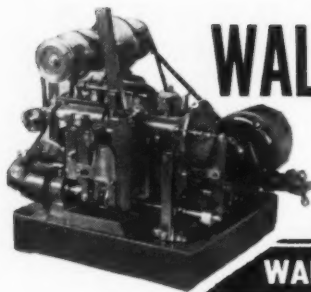


**Trims both ends of soft or thin metals smoothly, accurately, in half the time.**

Cuts both ends square or at any angle up to 45°. Automatic feed—7 to 21 strokes a minute. Capacity: thin metal up to 2" high, 4" wide; 7" to 72" long. Motor-units have V-belt drive—1600 r.p.m.

Write for Bulletin No. 195-V

**OLIVER MACHINERY COMPANY**  
GRAND RAPIDS 2, MICH.



# WALTHAM

## PINION AND GEAR CUTTING

### *Machines*

These machines are finished according to the work to be done. Send samples or dimensioned drawings and tell us about the cutting qualities of the material and probable production per week or month. Then wait for our reply with bulletin.

### WALTHAM MACHINE WORKS

WALTHAM 54  
MASSACHUSETTS

31. **Alnico Perma-Drum Magnetic Separator** used for tramp iron removal, concentration of magnetic substances from associated non-magnetics, reclamation of iron from foundry slag, etc. is described and illustrated in a new 8-page, 2-color catalog. Application, operation and design information included, with typical installation diagrams. No. C-1100A. Dings Magnetic Separator Co., 4740 W. Electric Ave., Milwaukee 14, Wis.

32. **Peck Spring Assortments** described in a bulletin offered to development and maintenance engineers; spring assortments for general use are discussed. Springs are adaptable for use in emergencies or where an occasional spring is required. Bulletin sent upon request to The Peck Spring Co., Plainville, Conn.

33. **Standard Dializer** for converting A.G.-D. adjustable limit snap gages into dial type snap gages, a new development by Standard Gage Co., discussed in a 4-page, illustrated folder giving construction details and pertinent information. Available upon request to Standard Gage Co., Inc., Poughkeepsie, N. Y.

34. "Whatever Your Needs in Roughness Measurement", a new illustrated bulletin on the line of Profilometer equipment manufactured by Physicists Research Co., discusses the range of work, both internal and external, covered by Profilometer Tracers, as well as appropriate piloting for each tracer and standard piloting equipment. Request Form No. L11-4-50W. Physicists Research Co., Ann Arbor, Mich.

35. The **Enco Miti-Mite**, a magnetic holder for test indicators and Handi-Lites, said to be a new approach in universal mounting devices, is presented in a 2-color bulletin giving features, complete specifications and illustrations depicting the Miti-Mite's uses. Bulletin No. 600 is available upon request to Enco Manufacturing Co., 4524 W. Fullerton Ave., Chicago 39, Ill.

36. **Leslie Hand Punch Press**, with a capacity up to 15 tons, featuring accurate punch and die alignment, useful for short run blanking, is described in a new bulletin giving complete specifications, typical blankings, with a list of punches and dies, adaptors and die shoes and ac-

**MACHINISTS—TOOL AND DIE MEN—SHEET METAL WORKERS—ETC.**

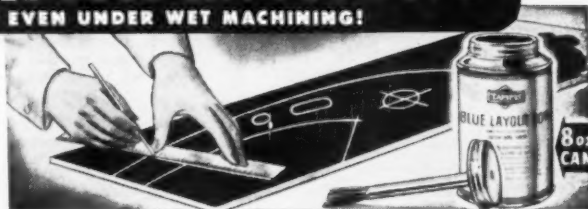
## FREE SAMPLE BLUE LAYOUT DOPE

**STAYS PUT EVEN UNDER WET MACHINING!**

Speeds layout on all metals. Dries fast. Oil resistant. Won't chip, crack or flake off. Comes in handy 8 oz. brush-in cans, pts., qts., drums. Order now!

**TAMMS INDUSTRIES, INC.**  
(formerly Tamms Silica Co.)

228 N. LaSalle St., Chicago 1, Ill.



cessories. Bulletin 1149 available upon request. Leslie Welding Co., 2943 Carroll Ave., Chicago 12, Ill.

37. **Morrisflex Flexible Shaft Equipment** is reviewed in a 24-page, 8½" x 11" catalog containing the complete line of machines and accompanying accessories, including wire and fibre brushes, shattering, adaptors and spindles, handpieces, rotary cutters and files, decarbonizing sets, and other equipment. Catalog will be sent to interested firms upon request to **The Morrisflex Works, Clay Lane, Coventry, England.**

38. **Taft-Peirce 24" Lapping Machine**, a precision unit for finishing cylindrical machined parts, small flat work, small pump housings, valve fittings, and any parts requiring a flat or cylindrical lapped finish, is discussed in a 4-page bulletin containing complete specifications, supplies and accessories. Bulletin is available upon request. **The Taft-Peirce Manufacturing Co., Woonsocket, R.I.**

39. **Abart Right Angle Gearmotors** are discussed in a new 4-page illustrated folder containing listings of the complete line of both single and three-phase types. Dimension tables and prices are given. Ask for Bulletin B250. **Abart Gear and Machine Co., 4828 W. 16th St., Chicago 50, Ill.**

40. **Electrical Rotary Actuator** for industrial applications is described in a new 4-page bulletin. This compact, 2¼ lb. unit is for use on either low voltage d.c. or 110 volt a.c. Standard gear ratio produces 350 inch-pounds operating torque through 180° maximum rotation. Request Bulletin 112 from **Airborne Accessories Corp., 25 Montgomery St., Hillside 5, N. J.**

41. **Master Tools for Master Craftsmen** is a new 4-page, 2-color bulletin containing six precision set-up tools with adequate specifications and illustrations. Multi-Swivel Platens and Bases, Platens, Swivel Vises, Flanged Vises and Multi-Swivel Vises are described. Bulletin sent on request to **Donovan Manufacturing Co., 80 Batterymarch St., Boston, Mass.**

42. **Electric Hand Shears**, 14-gauge capacity, Model GES-9 are described in a new price list containing complete specifications and illustrations, power requirements, etc. Model GES-12, of 12-gauge capacity also discussed. New, lower prices included in this bulletin, available upon request from **Jefferson Engineering & Manufacturing Co., 269 Walker St., Detroit, Mich.**

# BAUMBACH

## THE FIRST IN DIE SETS



Being originators of Standard Die Sets naturally we are steps ahead in Design—Precision—Dependability and Economy. Baumbach Die Sets can be disassembled. The Leader Pins and Bushings can be used on other size Die Sets—reducing inventorying a lot of Die Sets. Costly machining time is also reduced. Learn all about Baumbach advantages before you buy. Write for circular.

**E. A. BAUMBACH MFG. CO.**  
1810 S. Kilbourn Ave., Chicago 23, Ill.

## DRILL OVERHEAD

on the horizontal,  
or in ordinary up-  
right position — *Safely!*

Your drill cannot jerk out of control when it's mounted securely on a **SAFEGWAY HOLDER**. Nor can it "grab" on the final cut to cause injury or damage — because it's **ALWAYS FIRMLY SUPPORTED** by the screw feed . . . This holder is light enough to be handled easily (by one man) yet husky enough to hold drills up to 2 inches — **SAFELY!**



Priced Right — Ask for  
Illustrated Folder

### SAFEGWAY ENGINEERING

Box 296, TINLEY PARK, ILLINOIS

## Literature Mentioned in This Month's Advertisements

**43. Lucifer Electric Heat Treating Furnaces**, rigidly constructed of the finest materials, with a temperature range of up to 2000° F. Both floor and bench models are available. Insulating refractory of at least 5" all the way around. Descriptive catalog available. **Gilbert S. Simon-ski**, 401 N. Broad St., Philadelphia 8, Pa.

**44. Gorton Tracer-Controlled Machine Tools and Accessories** embodying practical advantages on the production line and in the tool room are described in detail in new Bulletin 1655-1406. Vertical and horizontal milling machines, pantographs, tool grinders, automatic lathes and duplicators. See advt. this issue. **George Gorton Machine Co.**, 1407 Racine St., Racine, Wis.

**45. Milmaster for Horizontal and Vertical Milling Machines**, a useful and ingenious device for converting either of the above types into a universal type miller, built by a metalworking specialist. The Milmaster is said to bring new efficiency and economy in service to plants which have installed them. See coupon this issue. **Bemis & Call Co.**, 145 Main St., Springfield, Mass.

**46. Neutrol Magnetic Chuck Controls** release and demagnetize workpieces; save marred, distorted workpieces and prevent damaging of magnetic chuck faces, as well as protecting chucks against harmful voltage surges. Descriptive bulletin is available upon request to **Electro-Matic Products Co.**, 2235 N. Knox Ave., Chicago 39, Ill.

**47. Atrax Carbide Tools**, including Burs, Mills and Reamers feature long-lasting qualities, rigidity, comparative freedom from tool breakage, considerable savings in original investment. Bulletins A-60, (Burs), A-64 (Mills), and A-62 (Reamers) contain the facts. Available upon request from **The Atrax Co.**, Francis Ave. and Day St., Newington 11, Conn.

**48. Hydraulic 150 and 200 Ton Shop Presses** equipped with either hand or power-driven pumps contain many outstanding construction and operating features outlined in new Catalog No. 313 containing complete specifications. Standard or special types available. **Rodgers Hydraulic, Inc.**, 7453 Walker St., St. Louis Park, Minneapolis 16, Minn.

**49. Die Sets** in a hurry can be procured in emergencies; classified telephone directory lists Producto in 34 cities in the U. S. and Canada. When time is an important factor and quality is a "must", call or write **The Producto Machine Co.**, 960 Housatonic Ave., Bridgeport, Conn.

**50. Whistler Adjustable Perforating Dies** permit quick and easy rearranging when change orders are received from the engineering department. Savings in production time, especially where die piercing operations are involved. New set-ups can be arranged right on the press. New Whistler catalog just issued. **S. B. Whistler & Sons, Inc.**, 760 Military Road, Buffalo 17, N. Y.

**51. Gardner Abrasive Discs and Wheels**, for grinding any substance from tough metals, soft alloys, hard rubber, concrete or terra cotta; will do work requiring rough snagging operations or micro-inch finishes. Wire-Lokt Wheels are made in many types, bonds, grades and grains to meet a variety of needs. Write for new booklet "Gardner Abrasive Products" to **Gardner Machine Co.**, 436 E. Gardner St., Beloit, Wis.

**52. Rotocast Hydraulic Cylinders** made in seven standard mountings, is sizes from 2" to 8" bore, any stroke length up to 8 feet. Four piston rod end types. Operating pressures up to 1500 p.s.i. Engineering counsel will recommend proper cylinders for special applications and installations. Free catalog on request to **Logansport Machine Co., Inc.**, 807 Center Ave., Logansport, Ind.

**53. Automatic Thread Roller** produces from 120 to 150 pieces per minute; provided with completely automatic feed, filtered lubrications, table top working level, vibration free operation, quick set-ups; Class 3 fits. See coupon in this issue or write for Bulletin TR-100 to **The Hartford Special Machinery Co.**, 287 Homestead Ave., Hartford 5, Conn.

**54. Pin and Wedge Reamer Design** for better size and finish control are offered in h.s.s., cast alloy or carbide tipped styles. Feature irregular blade spacing for improved finishes, more blades per reamer diameter, easy adjustment, quick set-up, longer service. Data File No. 9826 available upon request to **Barber-Colman Co.**, 9826 Loomis St., Rockford, Ill.

# COMPAROSCOPE THE OPTICAL INSTRUMENT TO EVALUATE SURFACE FINISHES



The Comparoscope is a dual microscope equipped with a masterstage, that can be inter-changed with a 16 station master-turret. Inspection-stage and master-stage furnish identical magnification, under identical intensity of illumination. The split image observed in the eye-piece, permits therefore, a direct comparison of the surface obtained, against the master-finish. The operation of the Comparoscope is simplicity in itself, and gives the same quick indisputable answer to the production-worker as to the train specialist. The masters may be round or flat specimens, and their dimensions are limited only by the capacity of the master-clamp.



Specimens of any type up to 1/4" thick, can be mounted in the turret in a few minutes. Individual turrets can contain specimens of all important components for an entire product. A physical quality control system suitable for distribution to suppliers as well as for home office reference can be thereby established.

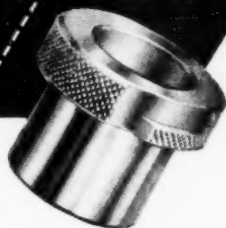
Effective quality control demands continuous surface-finish-inspection directly at the machine. The Comparoscope can be removed from its stand. Its compact design and light weight permit easy handling by the machine operators and floor inspectors. This feature has contributed greatly to the wide acceptance of the Comparoscope throughout industry.

**COMPAR INSTRUMENT CO. 16179 HAMILTON AVE. DETROIT 3, MICH.**



**IMMEDIATE DELIVERY!**

*American* **DRILL JIG BUSHINGS**



**EXCLUSIVE DISTRIBUTORS IN EVERY MAJOR LOCATION THROUGHOUT THE U.S. AND CANADA CARRY ALL SIZES IN STOCK FOR IMMEDIATE FREE DELIVERY. YOU ARE ASSURED OF QUALITY - SERVICE - IMMEDIATE DELIVERY**

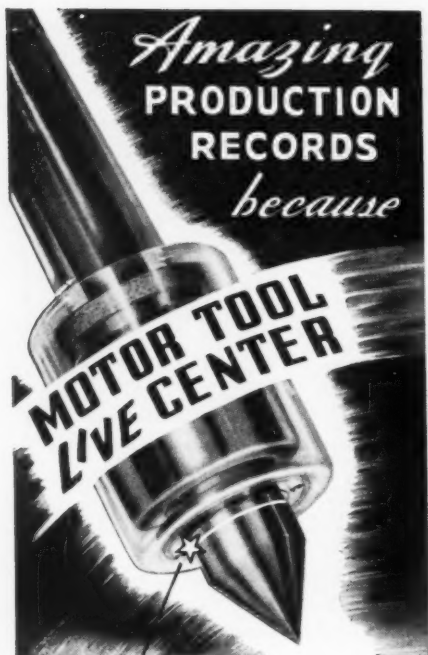
SEND FOR CATALOG

*American Drill Bushing*  
**CO., INC.**



**5107 Pacific Blvd., Los Angeles 11, Calif.**  
SPECIALIZING ONLY IN DRILL BUSHINGS





is the **ONLY** Center  
with the  
**OVERLOAD  
INDICATOR**  
Look for the **RED BAND**

You no longer have to guess whether you are overloading your live center thrust bearings if you use **MOTOR TOOL LIVE CENTERS**. When the load is too great the **RED BAND** around the spindle disappears into the housing. You can see at a glance when overloading occurs. This is an exclusive feature, developed by Motor Tool which cuts repair costs to practically nothing if due diligence is exercised. As long as the **RED BAND** is visible you are running **COOL** and **SAFE**.

Send for

NEW descriptive folder . . . and verified case histories of how **MOTOR TOOL LIVE CENTERS** have out-performed and outlasted ALL other centers on exceedingly tough, continuous-run jobs.

**MOTOR TOOL MFG. CO.**  
P.O. BOX 3805 PARK GROVE STATION DETROIT 5, MICH.

Make it a Rule  
to Call Motor Tool



Appointment of **George T. Fraser** as assistant manager of Tool Steel Sales for Crucible Steel Company of America, New York, was announced recently by H. M. Givens, Jr., manager of the Tool Steel Sales division.



George T. Fraser



Austin E. Cole

**Austin E. Cole** has been elected treasurer of Illinois Tool Works, Chicago, according to a recent announcement by Harold Byron Smith, president.

Appointment of **John H. Elliott** as assistant general manager of operations of Carnegie-Illinois Steel Corp. has been announced by this U. S. Steel subsidiary. At the same time, **Arno L. Billeter** was named general superintendent of the company's Irvin works, near Dravosburg, Pa., succeeding Elliott.

Election by the board of directors of **Cecil H. Gay**, works manager of the Barberton, Ohio plant of The Babcock & Wilcox Company, as vice president has been announced by Alfred Iddles, president.

Directors of Mid-West Abrasive Company, Owosso, Mich., have elected **Daniel Wardlaw**, veteran employee, to a vice presidency in charge of coated abrasive manufacturing.

Appointment of **E. H. Forsstrom** to the newly created position of Director of Training was announced by C. B. Pollock, vice president in charge of production of Allegheny Ludlum Steel Corporation, Pittsburgh.



The newly appointed president of the Hydraulic Press Mfg. Company of Mount Gilead, Ohio, is **John C. Cotner**. His appointment became effective May 1st.



**John C. Cotner**



**Robert S. Cave**

**Robert S. Cave** has been named general sales manager of Severance Tool Industries Inc., Saginaw, Michigan.

**M. Russell Kambach** has been named advertising manager of Aluminum Company of America, it has been announced by Arthur P. Hall, the company's director of public relations and advertising. Kambach is succeeded as assistant manager by **Jay M. Sharp** of the ALCOA advertising department.

**Roland W. Burt** has been appointed sales manager of the Chicago plant of Joseph T. Ryerson & Son, Inc., steel distributors, according to a recent announcement by H. B. Ressler, first vice president.

**Carl E. Schmitz**, vice-president and director of engineering, Crane Packing Co., Chicago, was elected vice-president-at-large of the American Society of Lubrication Engineers, at the annual convention recently concluded in Detroit.



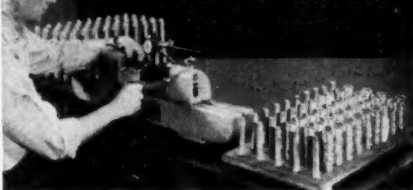
**Carl E. Schmitz**



**H. O. Holland**

The board of directors of Automatic Steel Products, Inc., Canton, Ohio, has elected **H. O. Holland** vice-president in charge of sales of all divisions of the corporation.

## Get Better Production from PRECISION CHECKING



### Pump Rotors Checked to Within .0005" on Sundstrand Bench Center

Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. For instance, this manufacturer of pumps checks the concentricity of the O.D. of the pump rotors within .0005" with the spline and checks side runout with the spline to within .0005". You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

"One-hand control" over all movable elements leaves the operator's other hand free to control rotation of the part being checked. Either headstock or tailstock can be unclamped, positioned and locked in place with a single hand operating the top lever. Investigate this bench center today.

### Complete Range as Follows:

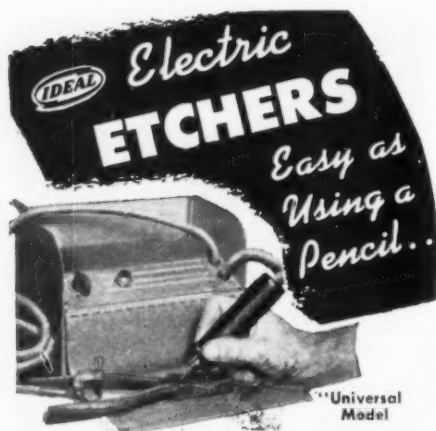
6" x 18"	12" x 36"	12" x 60"
6" x 36"	12" x 48"	12" x 72"

### FREE Additional Data

covering complete specifications and additional features is contained in this bulletin. Write for your copy today. Ask for data sheet No. 498.



**Sundstrand Machine Tool Co.**  
2535 Eleventh St., Rockford, Ill., U.S.A.



## Mark Iron, Steel or their Alloys

Burns a permanent mark right into the metal. Easiest, fastest way to mark part numbers and sizes—material description—owner's name on tools—identification of warehouse items—serial numbers, etc. Easily portable, nothing to get lost. Safe. "Universal" Model—four etching heats; 120, 240, 420 and 700 watts.

## LIVE CENTERS

The point turns with the work, permitting "hogging cuts" to be made at high speed . . . point will not burn off and cause tool to gouge work. Permanently accurate due to short overhang and unique bearing arrangement. Has special bearing seal. Sizes 1 to 5 Morse taper. "Heavy Duty" model also available.



- Increase Lathes Output
- Eliminate Burning of work or center

### OTHER IDEAL PRODUCTION SHORTCUTS

Available from your Ideal Distributor:

"Hand-Type" Tachometers  
Demagnetizers • Dust Collector

Sold Through Leading Distributors

### CLIP AND MAIL TODAY



IDEAL INDUSTRIES, Inc.

144 Park Avenue, Sycamore, Illinois

Please forward catalog information on Etchers, Live Centers, etc.

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

T. W. Gabriel, general sales manager of Firth Sterling Steel & Carbide Corporation, has announced the appointment of E. A. Carpenter as Chicago district sales manager and of C. E. Hughes as district sales manager of the newly created Southern District, with headquarters in Birmingham, Ala.

At a recent meeting of the Board of Directors of Fairbanks, Morse & Co., Chicago, two new vice presidents were elected. These are O. O. Lewis, vice president in charge of sales, and F. J. Heaslip, vice president in charge of purchases and traffic.



F. J. Heaslip



O. O. Lewis

Arthur S. Brown, president of the Clapp Instrument Co., Webster, Mass., announces the appointment of A. E. Campbell as sales manager.

The New Britain Machine Co., New Britain, Conn., announces the appointment of Alfred J. LeBrun as Connecticut sales engineering representative of their Lucas Division.

Herbert H. Rogge was recently elected president and chief executive officer of the Canadian Westinghouse Company Limited, Hamilton, Ontario. The board of directors also elected Harold A. Gooch, former president, as chairman of the board.

A. J. Edgar, general manager of Hunt-Spiller Mfg. Corp., Boston, has been elected a vice president of the company.

Nicholson File Company, Providence, R.I., announces the appointment of C. E. Ingham as representative in the Greater New York and New Jersey areas where he will replace James Jaques, who has been transferred as representative in charge of sales in Indiana and southwestern Michigan.

The stockholders of the Allis-Chalmers Manufacturing Co., Milwaukee, elected Walter Geist to his ninth term as president of the company, and re-elected all other officers and directors of the firm.

## Cut Costs IN TAPPING AND REAMING!



The Ziegler Tool Holder helps to cut down tapping and reaming costs because it reduces set-up time. By compensating for inaccuracies in aligning the work with the spindle, even though they amount to as much as 1/32" radius or 1/16" diameter, it makes it unnecessary to spend the extra time required in making set-ups to fine tolerances. Try it and see!

13563 Auburn,

W. M. ZIEGLER TOOL CO.  
Detroit 23, Mich.

*Ziegler*  
ROLLER  
DRIVE

WRITE FOR  
CATALOG

**FLOATING HOLDER**  
for Taps and Reamers...



## SCHAUER SPEED LATHES

File  
Lap  
Polish  
Burr  
Grind

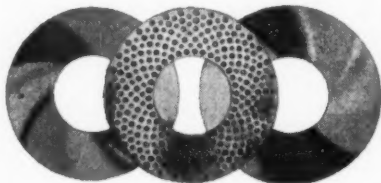
**SMALL PARTS**  
*faster,  
at less cost!*

Write for Bulletin 490

**SCHAUER MANUFACTURING CORP.**

2064 Reading Rd. Cincinnati 2, Ohio

## FLAT OR GROOVED RACE BALL THRUST BEARINGS WITH BRONZE RETAINERS



We can make them up to 25" outside diameter. We are geared to handle all of your thrust bearing needs.

**Send us your blueprints**

Makers of all types of dependable thrust bearings for over 30 years.

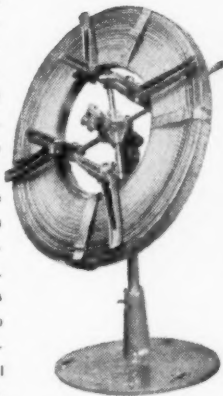
**ACORN BEARING CO.**

68 Stanley St.

New Britain, Conn.

## QUICK-LOADING STOCK REELS

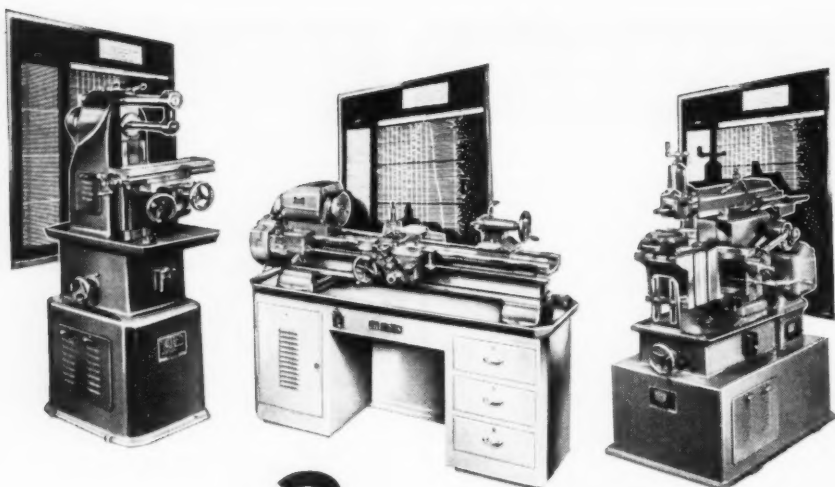
The S and S stock reels with quick loading arms are designed for the economical handling of stock from coils. Constructed with a snap lock knuckle joint for loading. These reels may be set in any plane from vertical to horizontal. Double swivel reels are manufactured so that loading is possible while other spool is reeling out stock.



Dial And Roll Feeds For Presses



**MACHINE WORKS**  
4539 W. Lake St., Chicago, Ill.



# 3

## Small Machine Tools that cover large production areas

- \* Increased collet capacity
- \* More power to cutting point
- \* Zero Precision taper roller bearings—more speed, longer life, extreme accuracy

Inexpensive to buy, space and power saving, light, fast and easy to operate, these improved SHELDON Machine Tools embody new engineering that gives them **increased capacity for size.\*** scientific distribution of mass has given rigidity and stamina without clumsiness.

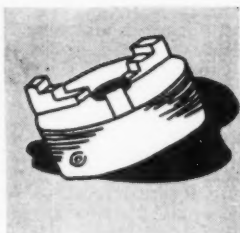
Here is a new development in **profitable production**—a way to obtain more pieces per hour at a lower cost per piece.

**Write for catalog.**

# SHELDON

## CHICAGO

**SHELDON MACHINE CO. INC., 4242 N. Knox Ave., Chicago 41, Ill.**



**MTBB**  
JULY, 1950

## *What's New in Metalworking*

### **BARBER-COLMAN IMPROVED GEAR HOBBER**

Barber-Colman Co., 1305 Rock St., Rockford, Ill., is announcing an improved model of the No. 16-16 Gear Hobbing Machine, designed to provide closer control over finish and accuracy and to increase job output and flexibility.

#### **Automatic Hob Shifter**

The Automatic Hob-Shifter is now available as extra equipment on the 16-16 Hobbing Machine. This shifter is of the mechanical type, electrically actuated to shift in increments as small as .0026". The shifter moves either forward or in reverse by changing a selector lever and automatically resets the hob in a new cutting position after each machine cycle. Use of the automatic shifter on other Barber-Colman machines has produced increases in hob life up to 50% with a greater production of high quality gears.

The automatic hob shifter is mounted on the machine, integral with the hob slide, and is synchronized with the rapid traverse and main motors to reposition the hob after each return movement of the carriage.

As the hob is automatically repositioned after each cycle, cutting action is distributed evenly over all of the hob teeth.

#### **Hob Slide**

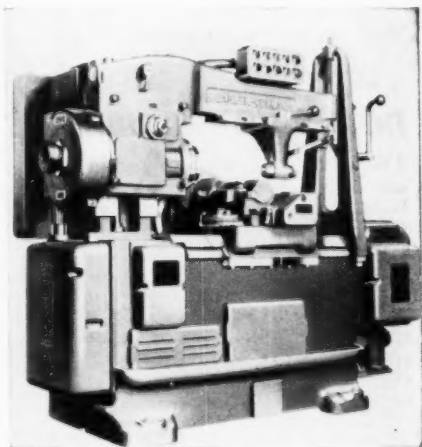
Redesign of the hob slide has provided a number of advantages for improved accuracy and flexibility of production. The slide is constructed to eliminate chips lodging between the gibs and the ways of the hob slide and the hob swivel. The gibs have been extended to the full length of the slide, to increase the rigidity between the hob slide and swivel.

The hob spindle is now provided with a standard milling machine taper to reduce the possibility of damaging the hob

spindle bearing by drawing up the hob arbor too tightly. The spindle is also fully supported at both front and rear for maximum accuracy. An improved outboard support on the hob arbor makes it possible to check the oil space conveniently.

#### **The Bed**

The machine bed has been redesigned to incorporate one flat and one "V" way for greater accuracy and rigidity. Way guards also protect the bedways against accumulation of dirt, chips or other foreign matter.



#### **New Feed Selector**

An electrically actuated jaw clutch is used to engage the feed. Pre-set stops on a new design feed control selector

**KIPP**  
*Air Grinders*



- **FASTER SPEEDS**
- **BETTER RESULTS**
- **LOW PRICES**

**MODEL JA**  
**50,000 R.P.M.**  
Weight 12 ounces; length 6¾ inches; chuck size ⅞ inch. Wheel guard removed for better illustration.

**\$42**  
**IN U.S.A.**

### THEY GRIND—NOT JUST RUB!

The RPM's stay up while grinding... not only when the grinder runs idle. It is an established fact that surface speeds must stay up to approximately a minute if you want to grind... not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work... longer wheel life.

### MADISON-KIPP CORP.

207 Waubesa St., Madison, Wis., U.S.A.

Write for KIPP Air Tool Catalog AT 3006

are actuated by limit switches. This arrangement makes it simple and easy to set up the machine for desired travel, feed and traverse distances.

#### Change Gears

All feed, index and differential change gears have been made identical in design, with 30° involute splined holes, so that only one full set of gears is required with each machine for universal operation. The speed change gears, also with 30° involute splined holes, are helical to give quieter machine operation. Intermediate change gear studs are directly connected to the central lubricating system for positive oiling at all times.

A bronze index gear replaces the former cast-iron gear to provide higher indexing speed. This feature is a distinct advantage when using carbide-tipped or "multithread" hobs.

#### Vernier Caliper Combines Inch and Metric Scales

A new vernier caliper is being introduced to the American market by Karl A. Neise, 381 Fourth Ave., New York 16, N. Y. This tool is the result of a careful investigation of the European precision tool industry for the purpose of finding a caliper which would meet modern American standards of accuracy at a price to fit the average mechanic's pocketbook.



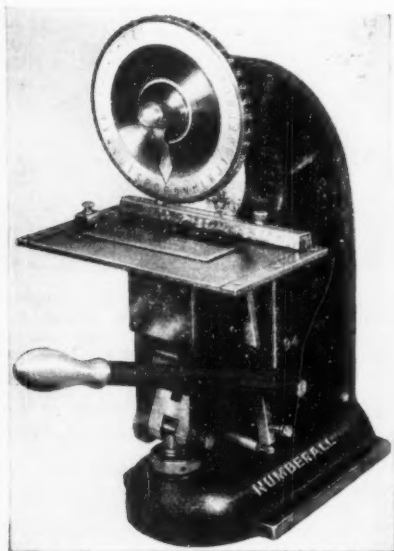
Made of high quality alloy steel, with glass hard jaws, the caliper designated as the Helios 55A, combines both English and metric scales in one tool for inside, outside, and depth measurement. Verniers are .001" and 0.1 mm., with a range up to 6" and 150 mm., respectively. A product of one of the old German precision tool firms, the accuracy of this caliper is absolutely guaranteed. A durable leather case is furnished with the tool.



## Automatic Numbering and Lettering Press

A new Numbering and Lettering Press with a Mono Wheel Automatic Spacer has recently been introduced by Numbrall Stamp & Tool Co., Huguenot Park, Staten Island, N. Y.

The new device, designated as Model 94, is used for the automatic stamping of letters and numbers in all kinds of

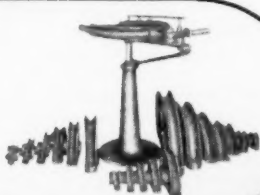


name plates and flat metal parts. Standard dials are engraved with 42 characters in heights of  $\frac{1}{8}$ ",  $\frac{3}{16}$ ",  $\frac{1}{4}$ ",  $\frac{5}{16}$ " and  $\frac{3}{8}$ ". Characters are engraved and make clear-cut impressions of uniform depth. The dials are made of high grade tool steel, scientifically hardened and tempered. Different size dials are interchangeable, but each size character requires a different spacing rack.

The carriage table advances one space with each impression of the dial, like a typewriter, doing rapid work, even spacing and alignment, the manufacturer states. Plates up to 5" in width and 6" long can be stamped; longer table and rack can be furnished if required. The depth of the impressions is adjustable by a screw on the bottom of the machine. The press can be operated by inexperienced help. It is strongly built and exerts a high pressure. Write for Bulletin 94-8.

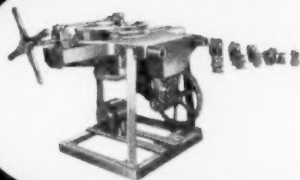
bend pipe by hand or power with

**American**  
Cold Pipe, Conduit and Heavy Wall Tube  
**BENDING MACHINES**  
Fast...Simple...Dependable  
**RADIANT HEAT BENDS**  
in Standard Pipe



Hand-Powered "American" A-30

Fast . . . Accurate . . . Average bend takes only 60 seconds! Up to 180° bends . . . all sizes from  $\frac{1}{2}$ " to 2". Usual radiant heat bends for  $\frac{1}{4}$ " at 6" and 9" radii can be supplied. Only 7 parts. Standard radius 5 times pipe size. Occupies 18" x 18" floor space.



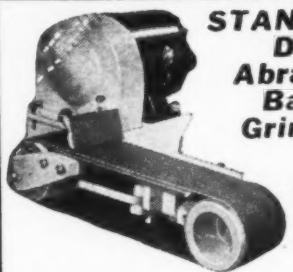
Motor-Powered "American" 2PB

Capacity  $\frac{1}{2}$ " to 2" standard pipe . . . Standard radius 5 times pipe diameter up to 180° . . . Maximum radius 13". Complete with rolls for each size pipe. Standard motor equipment 2 h.p.

Special radii  
supplied on  
request

**American**  
**PIPE BENDING MACHINE**  
Company, INC.

Factory and Main Offices:  
9 Furnace St., Poultney, Vt.



## STANDARD D-4 Abrasive Band Grinder

Famous  
for  
Stamina

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood 4x36 1/4" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW  
MANUAL ON FINISHING—WRITE TODAY

### WALLS SALES CORP.

306 E. 38th St., New York 16, N.Y.

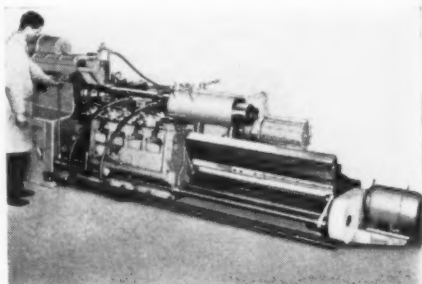


TYPE HOLDERS AND TYPE . . . ROLL MARKERS . . .  
HAND STAMPS . . . LOGOTYPES . . . DIES . . . STANDARD  
AND SPECIAL STAMPS . . . INSPECTORS' STAMPS . . .  
MACHINE ENGRAVING . . . PRECISION DUPLICATING

**NEW METHOD STEEL STAMPS, Inc.**  
149 Joseph Campau, Detroit 7, U.S.A.

## Lo-Swing Lathe for Multiple Tool Turning

The Seneca Falls Machine Co., Seneca Falls, N. Y. has announced a new type Model "LS" Semi-Automatic Lo-swing Lathe. It is a development of a lathe used during the war for turning large gun tubes; greater versatility and ease of change-over have been incorporated



The principal change is in the design of the front turning carriage which now may be equipped with two or more individually controlled, power operated cross slides which feed the tools into the cut. Tool cutting pressures are taken on large rolls, fitted to the bottom of each slide, which remains in constant contact with the cross feed cam.

Other new features include cam feed back-squaring attachments operating on an automatic cycle with push button control; an adjustable stop for positioning the carriage in relation to the starting point of the cut, and automatic tool relief at the end of the cut.

The New Model "LS" Lo-swing is a ruggedly constructed lathe designed to take advantage of modern sintered carbide tools, having tremendous cutting capacity at high cutting speeds and coarse feeds. Bulletin No. LS-50 describes and illustrates this new lathe.

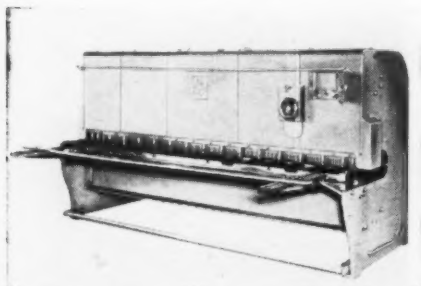
## Hydraulic Sheet Metal Shear

A new sheet metal squaring and slitting shear manufactured by the Johnson Machine and Press Corporation, Elkhart, Ind., uses hydraulic power to avoid overload. Known as the Hydra-Shear, the machine refuses to cut if over-loaded. When shearing, the knife pauses the instant it engages with the stock then eases its way through at a constant calibrated speed instead of crashing into the stock and diminishing speed at the end of the stroke.

A completely self-contained unit with

all working parts fully enclosed, the Hydra-Shear requires no special mounting but a level, 6" concrete floor.

The Johnson Hydra-Shear is available in twelve sizes ranging from 10 gauge to 5/16" shear capacity. The ten foot, ten gauge shear with an 18" throat, is 131" long, 53" wide and 66" high; it weighs 8600 pounds. A deep throat gap permits cutting of materials longer than the shear.



The manufacturers claim closer accuracy, and safer operation for the Hydra-Shear than can be obtained from mechanically actuated shears, plus time and labor saving features.

### Toolmaker's Rustless Vernier Calipers

The "Roch" Vernier Caliper, manufactured by the firm of P. Roch, Rolle, Switzerland, is stated to be a measuring instrument of the highest possible precision, and of the finest workmanship and finish. The exclusive United States representative is the Alina Corporation, 32 Broadway, New York 4, N. Y.

The material used in the "Roch" Caliper is high quality, rustless chrome nickel steel. The blade and jaws are hardened throughout. As is well known, the beam of an ordinary vernier caliper soon develops wear and may be easily damaged. Roch has overcome this disadvantage by making the slide out of rustless material and of such a degree of hardness in comparison with the bar that the wear between the two members is negligible, thus long life for the instrument is assured.

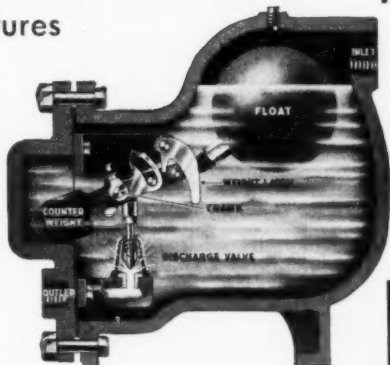
The material used eliminates the possibility of corrosion. The natural tendency for alteration of length in the course of time is avoided by a normalizing process after the hardening of the beam and slide. The sliding surfaces of the jaw are machined to such a close limit with the beam as to insure absolutely parallel jaws.

## Nicholson Air Traps CUT MAINTENANCE



with 3 Advanced Features

For promoting positive drainage of after-coolers, receivers, etc., these Nicholson weight-operated air traps are increasingly recommended, due to 3 features: 1) Larger valve orifice minimizes trouble from dirt, scale; 2) Special hardened stainless steel valve makes reseating seldom necessary; 3) Water seal positively leak-proofs. Three types; pressures to 1500 lbs. CATALOG 250.



**W. H. NICHOLSON & CO., 117 Oregon St., Wilkes-Barre, Pa.**

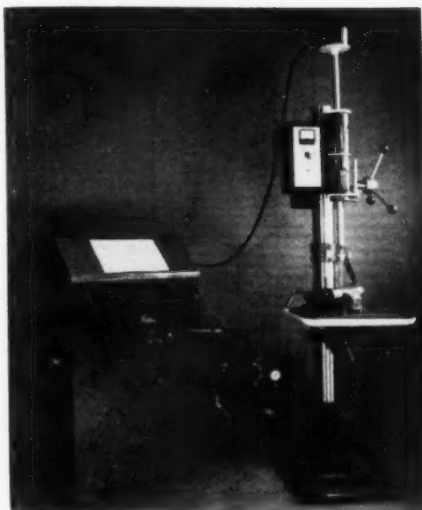
Steam & Air Traps • Control Valves • Expan. Mandrels • Arbor Presses • Welded Floats

## Elox Electron Drill for Hard Metal Drilling

The new Electron Drill, developed and manufactured by the Elox Corporation of Michigan, 740 N. Rochester Rd., Clawson, Mich., is said to approach or equal the speed of twist drilling. The manufacturer guarantees this equipment's performance and record speed on a money-back basis. This motor-driven automatic hard metal drilling machine employs a new patented electronic principle of operation and while using only 1/5th of the usual power, it increases the speed of cutting hardened steels as much as 15 times above previous Elox models.

The Electron Drill will accomplish a variety of applications; it was originally designed for production cutting of extremely small as well as large holes in hardened metals and for production of taps, drills and reamers in a variety of sizes. On either production drilling or salvage, performance can be duplicated on each piece in regard to speed of cutting and type of hole required. Drilling is a continuous process for the full length of electrode used.

The Electron Drill is entirely automatic. It also can be hand fed by the operation of a simple switch and will



chuck up 36" of electrode. It is a reliable and sensitive unit, giving perfect

## NOTCHING TUBING OR PIPE ENDS EASILY WITH

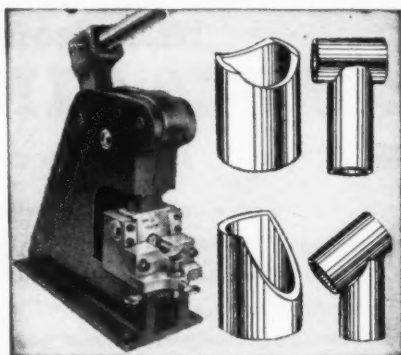
# ARC-FIT

Patent No. 2,126,519

## IN POWER PRESS OR HAND PRESS

Arc-Fit is a notching unit for preparing pipe or tubing ends in making welded or brazed tubular joints. Arc-Fit will prepare the ends of a pipe or tube in less than 5 seconds. Arc-Fit is a production tool that will cut your production costs. It is applicable in any industry where pipe or tubular construction is used.

- Arc-Fit can be utilized in any power press.
- Arc-Fit can be furnished for any size tubing or pipe.
- A hand press can be supplied with Arc-Fit units for shearing pipe or tubing sizes 2 inches or under.



- For sizes over 2", angular cuts other than 90°, and slotting operations. Quotation furnished on request.
- Arc-Fit does not deform pipe or tube. No grinding or finishing operation is needed.
- Engineers can now design for tubular construction and cut costs.

Write today for circular and prices.

Manufactured Exclusively by

# VOGEL TOOL & DIE CORPORATION

2525 Moffat Street

Chicago 47, Illinois

control as well as fast speeds on standard electrodes from .040" to .750" and larger.

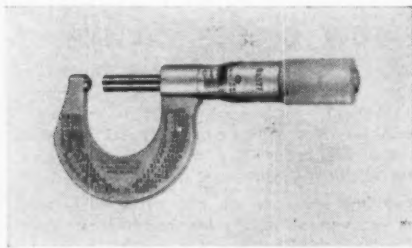
Designed as a production machine for drilling out broken tools or drilling holes in hardened metals, the Electron Drill will not affect or damage the material being worked on, such as by annealing or hardening the work piece. There is no sticking or welding, and no resetting of the machine is required during the drilling operation.

The Elox Electron Drill has nominal 2 KVA rating, using current at approximately the same rate as an electric toaster. It will operate from any 110-v. 60-cycle lighting system, eliminating the necessity of any special power supply.

Using the  $\frac{1}{8}$ " optimum size electrode, typical time cycles for drilling are: 25 seconds for  $\frac{1}{4}$ " hole, 60 seconds for  $\frac{1}{2}$ " hole, and 140 seconds for a 1" hole.

### New Micrometer with Rounded Anvil

This micrometer is provided with a rounded anvil which makes it possible to measure in thousandths of an inch the wall thickness of tubing, half bearings, and full bearings and various cylinders with walls up to 1" thick and diameters all the way down to  $\frac{3}{8}$ " inside diameter. The tool is a recent product of The L. S. Starrett Co., Athol, Mass.



The full finished frame as well as the thimble and sleeve have rust-resistant no-glare satin chrome finish which makes markings stand out sharp and easy to read under any illumination. Convenient decimal equivalents are stamped on the thimble, and graduations are quick reading with every thousandth numbered. Lasting precision is assured by the one-piece spindle with threads hardened, stabilized and ground from the solid. Hi-Micro finish on the ends of the anvil and spindle and simple sleeve adjustment are other features of the new Starrett micrometer.

### PORTABLE ELEVATING TABLE



**Saves  
TIME  
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Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height up to 15½", leaving operator's hands free. Table swivels and locks in any position.

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*Supreme*

## LAY-OUT AND IDENTIFICATION DYE

13 COLORS

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for trial sample and circular.

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## Big Steelweld Shear Cuts 1" Steel Plate

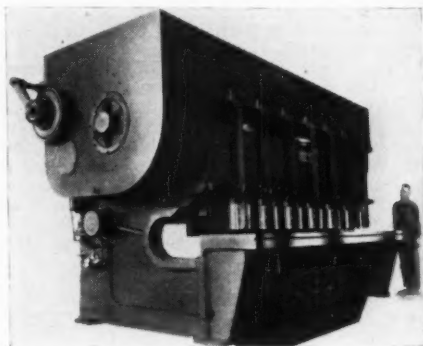
The heaviest Steelweld Shear built to date has been announced by The Cleveland Crane & Engineering Co., Wickliffe, Ohio. The machine has a shearing capacity of 12 feet of 1" steel plate.

The machine has no slides or guides for the knife to work in, because it makes use of an exclusive pivoted-blade cutting principle, with the upper blade operating on two heavy pins secured to the side frames, and traveling in a circular path.

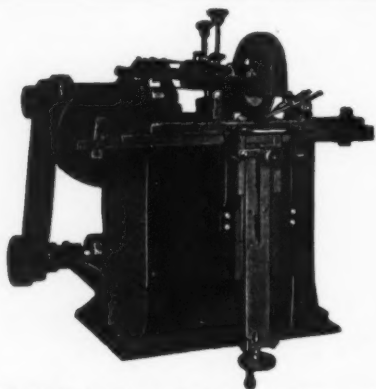
The Micro-Speed knife adjustment makes it easy to change knife clearance to suit various thickness plate; it is done in a matter of seconds simply by turning a hand crank and watching a dial indicator that shows the clearance in thousandths of an inch, as well as the plate thickness that may be cut for any knife setting.

This shear cuts at the rate of 25 strokes per minute. The throat is 24" deep, standard for all Steelwelds. Both frame and blade are of all-welded one-piece steel construction. The frame bed and crown are welded integral with side frames to provide rigidity and life-time accuracy.

Control of the machine is through the use of an electric foot switch that is connected to the shear by a cable to a receptacle at the front. The switch can be conveniently moved about the floor.



Safety was given careful attention in the design of the machine and protective features are provided throughout to eliminate all hazards as completely as possi-



Wardwell Model EC Combination Grinder. The only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

## How to make 10 hack saw blades do the work of 60

Impossible? Not with Wardwell EC Grinder. You can resharpen one gross of hack saw blades at least 6 times on the EC.

The savings possible on one gross of blades saves you enough to pay for the machine. Your old blades actually are given a keener, longer lasting cutting edge, because new blades are usually not ground after hardening.

**WARDWELL MODEL EC COMBINATION GRINDER SHARPENS CIRCULAR, HACK AND BAND SAW BLADES ON ONE MACHINE!**

Special Wardwell wheels will not burn, anneal or injure hardness of teeth.

Write for Bulletin EC today

**THE WARDWELL MANUFACTURING CO.**  
3165 Fulton Rd., Cleveland 9, Ohio



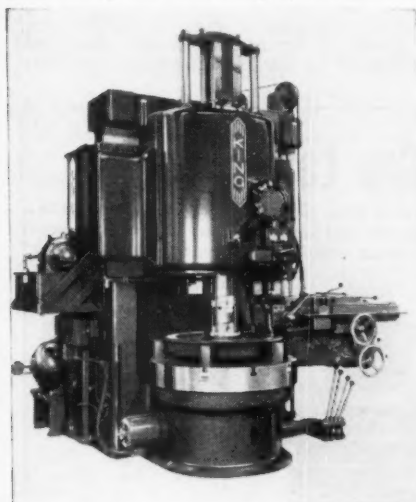
ble. All rotating parts are at the rear and out of the way. Knife and hold-downs are fully protected by a heavy plate-type guard.

### King Diesel Wheel Boring Machine

The King Machine Tool Division of American Steel Foundries, Cincinnati manufacturers of King Vertical Boring and Turning Machines, announces the development of a special Diesel Wheel Boring and Facing Machine.

Great rigidity has been achieved by the use of a massive fixed rail, which carries the over-sized boring ram and hydraulic feed cylinders. The ram uses a square type construction, permitting accurate alignment and easy adjustment by four large gibs. The cycle of this ram is fully automatic and can be set to rapid traverse to the work, rough bore at one feed, finish bore at another feed, form a radius at another feed, then dwell and rapid traverse out of the work.

A special motor operated power chuck holds the wheel securely and speeds up the loading and unloading operations.



The separate hydraulic power unit for actuating this boring head is located on the side of the machine. An over-sized side head assembly permits full use of the carbide tooling even while extended to machine the hub details.

One of the world's largest manufacturers of diesel locomotives has recently increased wheel production 50%, due to the outstanding design of this equipment.

## FOR SMALL JIG BORING

PUT SMALL JOBS ON THIS  
LINLEY MACHINE



and save your larger machines for heavier work.

### YOU'LL BE SURPRISED!

at the extremely low first cost and the vitally important jobs that this little precision machine can do. It will pay you to get our accuracy information on this machine which has 6" x 10" table movement and 7' x 17 1/2" table size.

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COMPANY**

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### Scope of Gear Rolling Inspection Broadened

The new Red Ring Rolling Fixture recently announced by National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich., is said to facilitate loading and unloading the work gear and enable larger and more complicated assemblies to be checked by this method.

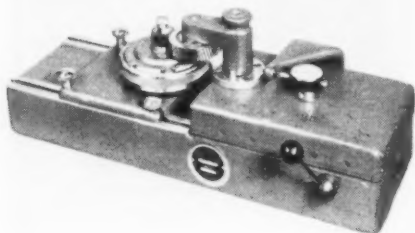
Gear rolling indicates errors in both size and eccentricity; it also serves as a check on excessive tooth roughness.

The illustration below shows the low sun gear and clutch assembly for an automatic transmission being inspected. The work part is held in a pot chuck, with a

C-washer and thumb nut to tighten it down. It is carried on the adjustable head at the left end of the fixture—adjustable for gears of varying diameter.

The master gear, used to check the sun gear, is held by the swinging head mounted on a precision ball slide carriage shown at the right. When the carriage is retracted by the hand lever, the swinging head may be lifted up and swung clear of the work gear for easy loading and unloading.

The inspection is made by advancing the carriage to bring master and work gears into mesh. The gears are held in contact by constant predetermined spring pressure, and rolled together. Errors are registered on the dial indicator just behind the swinging head.

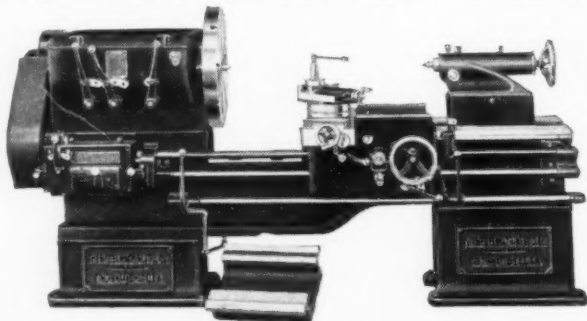


### Hand Operated Turret Punch Press

The Diamond Machine Tool Co., 3425 E. Olympic Blvd., Los Angeles 23, Calif. announces the development of a new improved, hand-operated Turret Punch Press. This machine greatly reduces the cost of piercing, embossing or forming of parts in quantities of less than 500, according to the manufacturer, as there

## NEBEL Removable Block Gap Lathes

furnished in the Geared Head Motor Driven Type, 3 Step Cone Double Back Gear Belt Driven Type or with Motorized Headstock. Especially adapted for repair and maintenance as well as for general manufacturing. Handle a large variety of work with large swing through the gap.



All Geared headstock type completely equipped with Timken Bearings, with motor mounted on rear of lathe. Quick change gear box, compound rest, steady rest, chasing dial, face plate, driver plate, wrenches, tool post and centers.

Furnished in four different sizes as follows: Series "LN" 18/27", Series "AA" 20/30", Series "B" 22/33", and Series "D" 25/40".

Write for Circular Giving Complete Information

**THE NEBEL MACHINE TOOL COMPANY**  
**CINCINNATI 25, OHIO**

are no dies to make and no dies to set. The press has a 13" throat and contains twelve punches and dies, any of which may be brought under the ram for immediate use by a turn of the index handle.



The capacity is 10 tons and the maximum punch size is  $1\frac{1}{2}$ " in  $\frac{1}{8}$ " mild steel. Anti-backlash gearing of turrets keeps punches in permanent precision alignment. A special punch was developed for this machine, permitting the piercing of steel up to twice the punch diameter within the machine capacity. The rugged 600-pound frame assures minimum deflection, thereby permitting maximum punch life and punching accuracy.

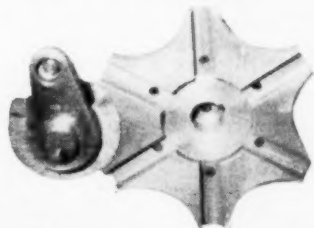
### **Solid Carbide Drill Bushings**

A complete line of solid carbide drill bushings for drill sizes of from .0280" to 1.750" is announced by S & E Machine Products, Inc., Bridgeport, Mich.

The new bushings, made to A.S.A. standards, are 100% interchangeable with standard steel bushings and require no reworking of present jigs and fixtures for substitution, according to the manufacturers.

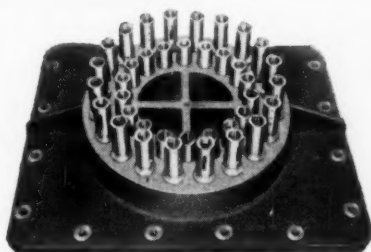
They are offered in four types; headless press fit, head press fit, fixed renewable and slip renewable. All are precision ground and lapped for exacting tolerance and finish. The head types employ steel rings which hold the carbide, forming no part of the bearing surface.

## **INTERMITTENT DRIVE? INDEXING? USE A GENEVA!**



**4-5-6-8 POINTS                      48 SIZES**  
**3" to  $5\frac{3}{4}$ " CENTER DISTANCE**

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**GENEVA MACHINE & TOOL CORP.**  
402 ELLAMAE AVE.  
TAMPA, FLORIDA



*Pictured: a 38-Spindle Heavy-Duty Drill Head*

**DESIGNERS AND  
MANUFACTURERS OF  
MULTIPLE DRILLING EQUIPMENT**

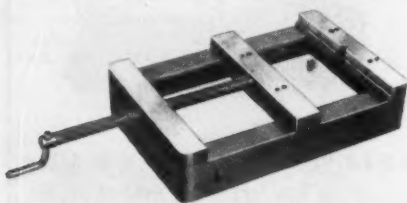
*We invite your inquiry.*

**MICHIGAN DRILL HEAD CO.**  
971 E. 8 Mile Road      Hazel Park, Mich.

### Sturdy Bay State Drill Vise

A rugged, light weight drill vise suitable for drilling, tapping, or reaming fixtures, dies and machine parts has recently been introduced by Bay State Tool & Machine Co., 412 Albany St., Springfield 4, Mass.

The Bay State Drill Vise is constructed of sturdy angle iron members formed and assembled into a light, rigid frame with strength only where it is needed.



The tool is made in two sizes, covering a wide range of work. The smaller unit measures 9" in length x 5" wide x 2 1/8" high, with a jaw opening of 5 1/4"; it weighs 7 lbs.; the larger vise is 12" x 8" x 2 3/4", with an 8 1/4" jaw opening and a weight of 15 1/2 lbs.

The work is held firmly in hardened and ground stepped jaws. A V-shaped notch is provided for holding round punches or hexagonal shaped objects. A hardened screw travels in the hardened end plate and is located near the top of the sliding jaw to reduce tipping tendency and tilting of work when clamping pressure is applied. An offset handle at the end of the screw facilitates rapid adjustment of the sliding jaw to the work.

The manufacturer can also furnish floating jaws for use with drill plates for gang drilling more than one piece at a time, or different pieces at the same time. This saves the cost of constructing expensive drill jigs and reduces the time for drilling, thereby lowering the cost for making the individual piece.

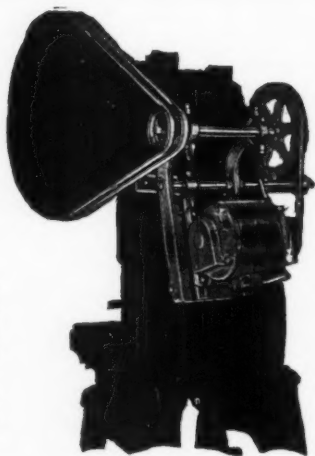
### Two New Flynn Boring Heads

Flynn Manufacturing Co., 443 Bates St., Detroit 26, Mich., specialists in boring heads for over 30 years, announce two new models for small jig borers, turret lathes and light milling machines.

The design of these two heads incorporates the two most popular features of

## Modern MOTOR DRIVES FOR EVERY TYPE OF MACHINE TOOL & PUNCH ... PRESS ...

Zip up production by gaining the advantages of independent Drives. The MODERN Drive using quiet, trouble-free V-Belts saves on power and eliminates the hazards and maintenance of line shafting. MODERN Drives are inexpensive — easy to install — will outlast the equipment they are mounted on. (Send today for full information on how you can cut costs and increase production. No obligation — but write today.)

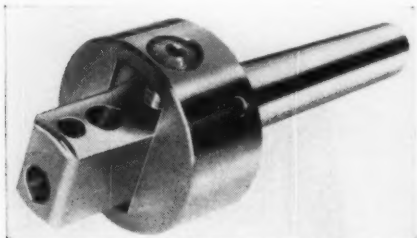


**MODERN MOTOR DRIVES**  
3818 W. GRAND AVE.

DIVISION OF

**NICHOLS  
ENGINEERING CO.**  
CHICAGO 51, ILLINOIS

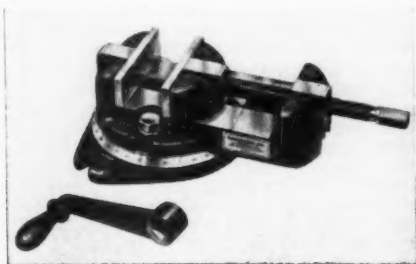
Flynn Boring Heads—the dovetail slide and the extended jaw or tool holder. These compact, light weight heads measure  $2\frac{7}{8}$ " in diameter; they have a bar capacity of  $1\frac{1}{2}$ " and will offset to a maximum of  $1\frac{1}{2}$ ". One head, Model 24 is designed to hold cutting tools in vertical position, and the other, Model 25, illustrated, holds cutting tools in both vertical and horizontal positions.



These tools are made with a safety round contour, ground micrometer screws with easy to read dial, graduated in thousandths of an inch; hardened V-tool locks, one wrench for all adjustments and threaded backs for interchange of arbors and adapters.

#### Kenco 4" Swivel-Base Vise

This new vise is said to incorporate certain design improvements, prominent among which is a unique system of numerical graduations around the beveled edge of the base, reading from 0 to 90° then back to 0, thus allowing synchronized readings from markers on either side of vise. It is a recent product of Kenco Manufacturing Co., 5211 Telegraph Road, Los Angeles 22, Calif.



The hardened and ground steel jaws (removable) are  $1\frac{1}{4}$ " deep x  $3\frac{5}{8}$ " wide x  $5/16$ " thick. The vise opens to a full 4" and may be used independently of its base. It is made of well seasoned semi-steel and weighs 16 pounds.

## ECONOMY

HEADLESS AND  
SOCKET SET SCREWS

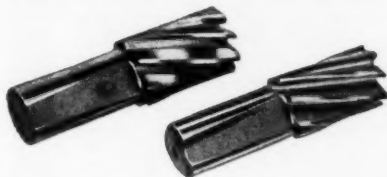


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**ECONOMY MACHINE PRODUCTS**

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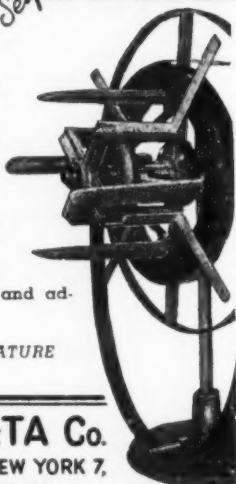
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*Adjustable  
Self Centering*

For feeding strip and wire coil stock to presses. Coil capacity 300 to 500 lbs. Outside ring dia., 28" to 36". Height of reel, 36". Wheel automatically adjusts parts to suit inside diameter of coils from 11" to 20". Arm allows for quick conversion to horizontal or vertical position and adjusts height of reel.

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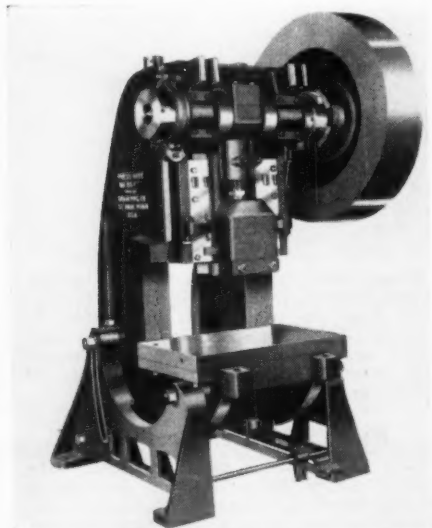
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# SNOW

SNOW MANUFACTURING COMPANY  
435 Eastern Ave. • Bellwood, Illinois  
(Chicago suburb)

## 85-Ton O.B.I. Power Press

A new 85-ton open back inclinable Press-Rite power press featuring a one-piece special alloy frame with built-in tie rods has been introduced by the Sales Service Machine Tool Company, 2363 University Ave., St. Paul 4, Minn., as an addition to their line of presses, ranging from 5 to 85-ton capacity.



The new Press-Rite o.b.i. power press has built-in tie rods to help reinforce the gap of the press; this permits larger die space with added strength, and eliminates deflection on heavy work. The design of this tie rod frame reduces binding or misaligning of dies on extra heavy drawing and blanking operations.

Other features of the new Model 85 Press include the Press-Rite non-repeat single stroke mechanism and the automatic cam actuated brake, anti-friction roller bearings in the flywheel, four-point engagement special sliding key clutch on the flywheel drive or air friction clutch and brake on the back geared press. The ram slide is extra heavy, with large and long ram ways, triple lubricated and counterbalanced, with steel bushed hole for holding die shanks in slide, plus the Press-Rite ball and socket adjusting screw with easy adjusting take-up retaining ring.

The bolster area of this press is 22"x 36", and the depth of throat is 12". The shut heights and strokes are optional.

MACHINE and TOOL BLUE BOOK



There is no sacrifice in the weight of the press because of the built-in tie rods, yet the height of the press from the floor to the center of the crank is only 78½".

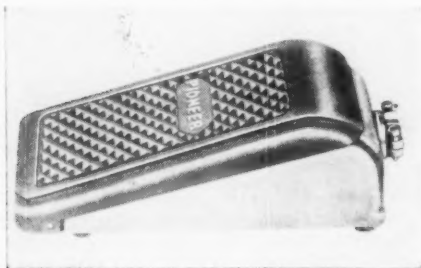
The new press can be furnished with either flywheel drive or back geared, standard sliding key clutch or can also be furnished with a built-in air friction clutch and brake for back gear presses only.

### New Adaptable Foot Switches

The Pioneer Patents and Products Co., 25 N. Franklin St., Chicago 6, Ill., is introducing a new line of versatile foot switches, which can be supplied in standard models, or can be altered at the factory to suit any specifications.

These switches give machine operators the freedom of both hands, thus eliminating time-wasting, often dangerous hand movements, while helping to speed up production. They are adapted for use on all types of power machines, photographic enlargers and for electrical devices.

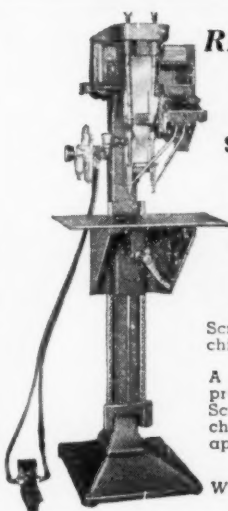
The Model FS-50, a standard Pioneer switch, is illustrated below. This switch



is equipped with a BX clamp, for use when it is desired to run a BX cable, Greenfield or other cord direct to the switch. It is rated 12 amps. at 125 volts, or 6 amps. at 250 volts, a.c.-d.c. Another model, No. FS-40, is furnished complete with a heavy-duty cord and plug, and also a standard outlet. This switch is rated 10 amps. at 125 volts or 5 amps. at 250 volts, a.c.-d.c. Both of these models are of the momentary-contact type, but a double-action model (press to start - press again to stop) is available. Where the switch must be fastened to floor, a mounting bracket is furnished.

Switches are finished in two-tone crackle gray, with dark-red pedal. Sturdily built, these switches will stand a lifetime of hard use.

July, 1950



### REYNOLDS MULTIPLE SPINDLE

#### Screw Driving Machines

Speed up production and reduce costs by driving from 2 to 6 screws at a time with Reynolds Multiple Spindle Screw Driving Machines.

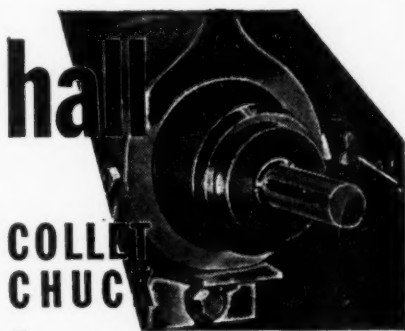
A complete line of production type Screw Driving Machines for every application.

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### COOK & CHICK CO.

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**SPEED UP** production in multiple operations with push-out type Hall Collet Chuck. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments...no bearings, friction, heat or loss of power. Instant release without stopping lathe.

2-inch capacity, \$145; 3-inch capacity, \$295;  
1-inch capacity, \$85

Round, square or hex collets, plain-serrated  
**HALL MANUFACTURING COMPANY**  
622 Tularosa Drive • Los Angeles 26, Calif.

## New Application for Granite Surface Plates

The Herman Stone Co., 324 Harries Bldg., Dayton, Ohio, announces a new application for their Granite Precision Surface Plates; a metal T-bar is installed in a rectangular slot and is bolted on the underside of the plate through holes every 12". In this manner, the pull is on the bottom of the plate. The slot is parallel with the side of the plate.



This new application increases the adaptability of the Herman Granite Surface Plate and is finding wide acceptance in industry. The picture above shows a dividing head in use on the plate in the plant of a leading gear manufacturing company.

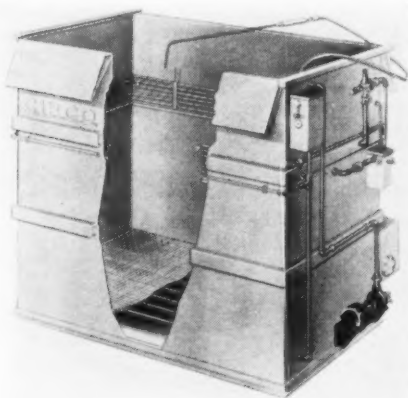
## High Capacity Vapor-Spray Degreaser

The design of a new, large capacity Vapor-Spray Degreaser is announced by Circo Products Co., 6531 Euclid Ave., Cleveland 3, Ohio. This new model, the

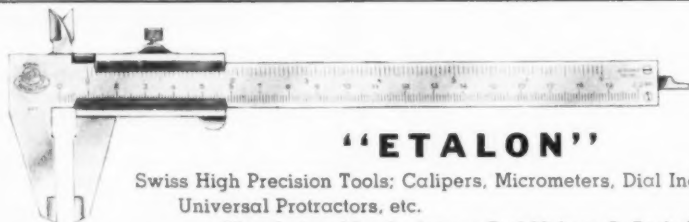
C-120, was designed for the transportation field and heavy industrial use. It has a vapor depth of 84", inside length of 96" and width of 60".

The C-120 degreaser is available in either nickel clad, stainless clad or zinc sprayed construction. Its nonflammable, non-explosive solvent is heated by steam, gas or electricity, forming a blanket of vapor which is 84" deep. Ample heat input assures a cleaning capacity of 18,000 lbs. per hour. An outside water jacket and inside water coils give double protection against vapor loss. Safe, economical operation is assured by a fully automatic control system.

According to Fenton Davison, vice president, "Circo-Solv," the solvent used,



is absolutely harmless to all metals." He further stated that "depending on size, parts degreased by the Circo vapor and spray method can be removed . . . clean and dry in 1 to 15 minutes."



No. 17

## "ETALON"

Swiss High Precision Tools; Calipers, Micrometers, Dial Indicators  
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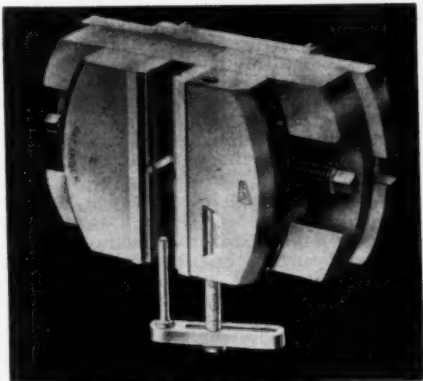
## Cosa Introduces "Zus" Universal Chuck

The "Zus" Universal Chuck, manufactured by the Swiss firm of Reglus, is now being distributed in the United States and Canada by Cosa Corporation, 624 Chrysler Bldg., 405 Lexington Ave., New York 17, N. Y. This new precision tool is stated to be ideal for use on lathes, indexing heads, circular milling machine tables and similar machine tools.

The chuck clamps concentric, and is eccentrically adjustable. It permits extremely accurate clamping of workpieces, the shape of which does not allow the use of standard clamping devices, such as collets, 3-jaw chucks, etc. Two models of the "Zus" Universal Chuck are available. The Type 1 chuck has a jaw height of 20 mm. ( $\frac{3}{4}$ " ), a jaw length of 80 mm. ( $3\frac{1}{8}$ " ), and a maximum clamping capacity of 60 mm. ( $2\frac{3}{8}$ " ). The eccentric displacement in either direction is 25 mm. (1" ). The Type 2 has a 40 mm. ( $1\frac{1}{2}$ " ) jaw height, 140 mm. ( $5\frac{1}{2}$ " ) jaw length, and a maximum clamping capacity of 100 mm. (4" ). Its eccentric displacement in either direction is 40 mm. ( $1\frac{1}{2}$ " ).

Standard accessories for the "Zus"

chuck include a complete clamping device, including one pair of jaws with "V" and recesses, adjustable stop and necessary wrenches, but without flange.



Special accessories available include smooth jaws, jaws with deep recesses, and flanges.

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## Hammer Features Replaceable Rawhide Faces

A new jaw-head hammer with replaceable rawhide faces has recently been put on the market by the Chicago Rawhide Manufacturing Co., 1321 Elston Ave., Chicago 22, Ill.

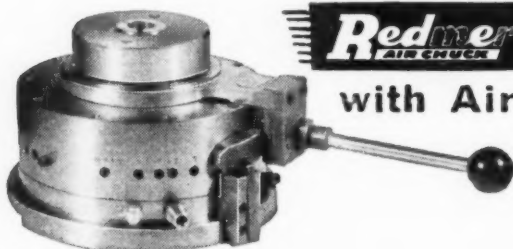
"This new jaw-head Rawhide hammer," said Harold W. Munro, of the Hammer and Mallet Division of the company, "permits the easiest replacement of faces yet developed. The workman simply loosens the nut, slips a new face between the adjustable jaws of the hammer head, tightens the nut and the hammer is again ready for use."

Rawhide is said to be the ideal striking surface for assembling, shaping, adjusting and dismantling valuable parts without surface or other injury. It does not become soft or brittle under extremes of heat or cold. Rawhide does not chip, to endanger eyes or fall into precision work. Rawhide striking surfaces do not load up with metal particles, mark or discolor finished surfaces or spark against metals. Rawhide blows, with less bounce and more follow-through, separate "frozen" parts when other striking materials have failed.

The manufacturer offers a complete



line of rawhide striking tools in standard sizes and types, with many special sizes



RC-5



## Index Chuck with Air Operated Collet

The REDMER INDEX CHUCK has twelve indexing positions and Collet capacity 1/16" to 2".

REDMER CHUCK can be had with either Index Collets or Standard Brown & Sharpe type collets.

No. FC-28

V-29

## Air Foot Control and Valve

The REDMER FOOT CONTROL & VALVE was developed in order to meet a demand for an AIR VALVE & FOOT CONTROL LOW IN COST but constructed to surpass the high priced Valves.



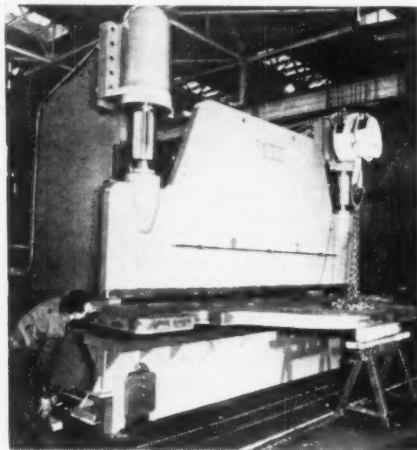
**REDMER AIR DEVICE CORP.**  
GUNTERSVILLE, ALABAMA, BOX 247

for particular jobs. Production, repair and maintenance workers have long appreciated the range of sizes, the balanced striking power and economy of these tools.

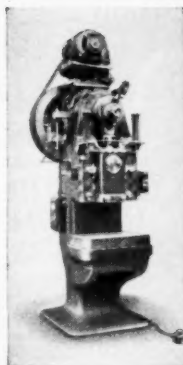
Rawhide mallets are light for gentle tapping or sharp light blows. With almost no metal on the surface they can be used safely in cramped spaces without injury to adjacent parts.

### Verson Hydraulic Press Brakes

Recently announced by Verson All-steel Press Co., 9303 S. Kenwood Ave., Chicago 19, Ill., is a new line of hydraulic press brakes, in addition to their regular line of mechanical brakes. Streamlined in appearance and operation, these machines bring the advantages of hydraulic operation to heavy plate work. They are stated to be suitable for straightening and for forming to templates where the forming requires repeated strokes. Since they are hydraulically operated and cannot be overloaded, they may be safely used for bottoming work.



Other advantages include the ability to deliver any predetermined tonnage (up to capacity), the availability of entire rated tonnage at any point during the stroke, elimination of die setting time, the ability to use all or any portion of the stroke and greater stroke length than is possible with comparably rated mechanical press brakes. The illustration above shows one of the new Verson 18-foot, 400 ton hydraulic press brakes being used to straighten a 6" plate.



**80% to  
100% more  
punch strokes  
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*ing, punching of*

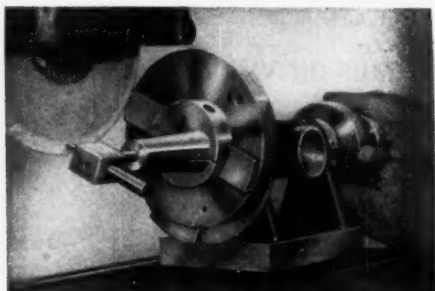
*heavy stock, 20 to 150 tons.*

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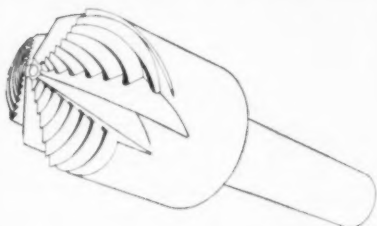
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**The New  
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The No-Burr Chatterless Countersinks are available from stock in 14 standard sizes of High Speed steel 60°—82°—90°—angles. Special sizes and angles made to your specifications.

Quality regrounding service for all types of carbide and High Speed steel rotary files.

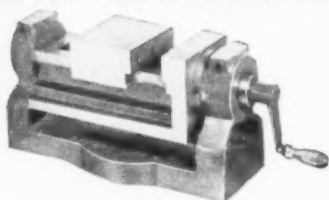
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**TRUNION VISE & ANGLE PLATE**



A sturdy, precision made vise mounted in husky trunions. Back of vise body is a precision ground surface, with tee slots to form an adjustable angle plate. Tool can be clamped at any angle, setting circle graduated in degrees, full 360°.

Jaw Width — 5"  
Jaw Depth — 1-5/16"  
Max. Opening — 5"  
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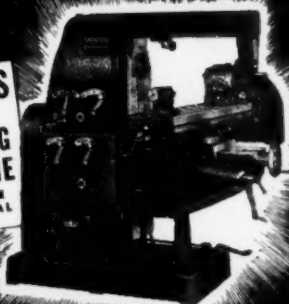


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Simple in design. Easy to operate. Rigid construction including every worthwhile modern feature of milling machine development. With 18 spindle speeds (20 to 1000 R.P.M.) both the universal and plain millers are readily adaptable for heavy duty or light precision production work. Send for bulletin.

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## Grinding Wheel Crushing Rolls

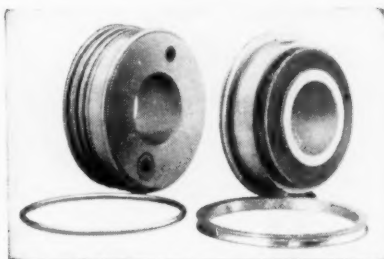
The Jerpbak-Bayless Co., Inc., Chagrin Falls, Ohio, manufacturers of wheel crusher rolls and forming rolls, announce their new Universal Wheel Crusher Rolls are now available for use with their portable, motorized wheel crusher fixture. The unit and the new Crusher Rolls crush-form grinding wheels with intricate and multiple forms for tools, dies, production parts, etc.

The No. 1 Wheel Crusher Roll is made up with a series of V-grooves in the periphery in which to mount round wire to produce a convex radius in the grinding wheel. The small wires are held in place by a locking key with which they are tightened to the proper tension. The larger wires are held in place by their own spring tension.

The No. 1 Roll has seven annular V-grooves which permit mounting of all wire sizes in .001" increments from .002" diameter through .130" diameter, with a minimum of 180° protruding above the surface of the roll. This economical method forms small concave radii on grinding wheels.

The No. 4 Universal Square Wire Roll is made up in the form of a shoulder

arbor with a precision collar that holds the basic square wire securely in place. As a complementary roll to the No. 1 Wire Roll, a 1/4" square ring is used, in which a concave radius is ground to produce a convex radius on the grinding



wheel. The same type of ring in larger widths can be used to form larger sections of a grinding wheel, such as used on form tools, etc. The advantage of this type of roll is that the cost of the ring in which the form is placed is very little in comparison to a solid roll.

# CUTTERS



**Hand Power      Lever Action**  
for  
**RODS      FLAT BARS      ANGLES**  
**WIRE ROPE**

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**CAPACITY:**  
 $\frac{3}{8}$ " to  $2\frac{1}{2}$ " drills.  
5" x 9" adjustable table.

**MOTOR:**  $\frac{1}{2}$  hp,  
3450 rpm.

**NET WT:** 250 lbs.

**CRATED:** 320 lbs.

**McDONOUGH MANUFACTURING CO.**  
EAU CLAIRE, WISCONSIN, U. S. A.

# Hobart A.C. Transformer Welders

Hobart Brothers Company, Troy, Ohio, announces a complete new line of transformer type a.c. arc welders with no moving parts. By means of an electrically adjustable reactor, the usual laborious cranking method of setting welding current is eliminated. Two models are now in production: Model TSP-205-C with power factor correction is rated 200 amperes at 30 volts; Model TSP-182-C with power factor correction and limited input for operation on REA lines is rated 180 amperes at 25 volts.

Control of the five main taps of welding current from low to maximum is accomplished with a large bakelite hand wheel switch, mounted on the front panel. Above this hand wheel is the rheostat control knob, which controls the amount of d.c. current flowing into the reactor to give 100 welding current settings in each of the five main steps.



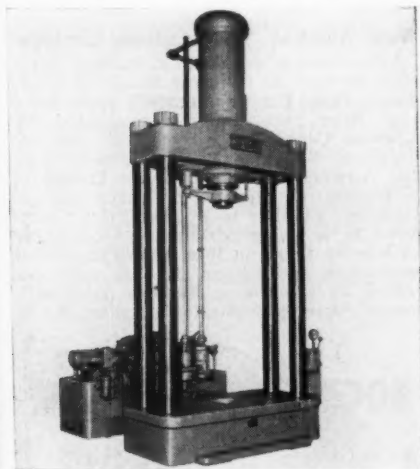
Thus, approximately 500 different welding current settings are available without changing electrode or ground cable connections, and without cranking.

In addition to adjusting the welding current by changing the relationship between the d.c. flux and the a.c. flux in the reactor core, the rectified (d.c.) current has the effect of regulating this relationship at the time the arc is struck to provide a higher than normal current at the arc for a fraction of a second. This gives the operator an instantaneous striking arc. By connecting the rheostat to the reactor circuit through a standard plug and receptacle, remote control is made possible. The rheostat can easily

be removed and used at a distance from the welder merely by inserting an ordinary extension cord with standard plug and receptacle.

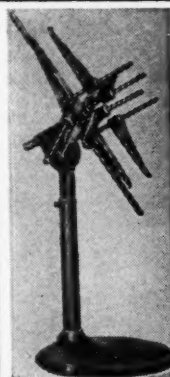
### Hannifin High Speed Assembly Press

A maximum of 275 inches ram speed per minute is a feature of this four-post hydraulic forcing press announced by Hannifin Corporation, 1130 S. Kilbourn Ave., Chicago 24, Ill. The unit shown below, which is used primarily for the press-fit assembly of shafts to armatures



and rotors, has an 82" gap, ram up, and a 48" maximum stroke. There are 60" between columns, left to right, and 10" front to back. The table, which is 36" deep (front to back), is 18" above the floor and has a 10" center hole to allow shafts to extend through the table. The ram is guided to prevent rotation if a fixture is used.

The unit incorporates the manufacturer's exclusive Sensitive Pressure Control, which allows the operator to vary, by the amount he moves the single hand lever, the amount of pressure applied. When a uniform pressure is to be applied repetitively, a stop is provided to limit the travel of this control lever. The predetermined pressure thus obtained can be varied all the way from 15 tons to the full 150-ton capacity. Since up-travel can be limited to that which is needed to accommodate the work, the press can be adapted to a wide range of press-fit assembly applications.



## Universal Stock Reel

The Humm Universal Stock Reel is an essential device for the handling and feeding of coil stock to Power Presses.

1. Adjustable Reel to fit various sizes of coil.
2. Reel is adjustable to suit height of Press.
3. Reel can be inclined to any position.

Stock Reel with plain bearing \$55.00

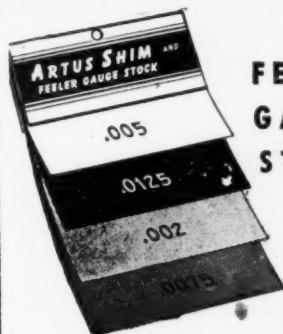
Stock Reel with roller bearing \$65.00

Manufactured By

**John Humm Safety Equipment Co.**  
253 SHEFFIELD AVE., BROOKLYN 7, N. Y.

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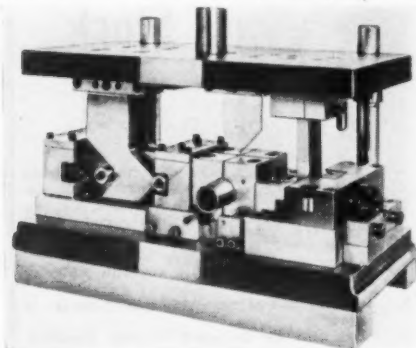
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## Vogel High Speed Tube Cut-off Shear

A new high speed tube cut-off shear, employing an arrangement of horizontal and vertical blades, and capable of cutting off up to 6,000 pieces per hour



while maintaining accuracy to .004" in piece length, has recently been developed by the Vogel Tool & Die Corp., 2525 W. Moffat St., Chicago, Ill.

The manufacturers say that this device is the fastest cutting-off method yet

developed; the new machine can be attached to a power punch press, and will produce clean cuts with a minimum burr or distortion, even in tough, stringy, thin walled tubing. A built-in automatic tube stop, which can be set to control the length of the cut off piece to .004" accuracy in any desired length, assures uniform pieces.

Tubing of any size, shape or wall thickness up to 3" o.d. can be cut off in the shear. Interchangeable dies permit quick change-over from one diameter to another.

## New Adamas Steel Cutting Carbide

After over a year's field testing, complete reports on the new Grade D tungsten carbide for steel cutting tools, have now been received and evaluated by Adamas Carbide Corp., 1000 S. 4th St., Harrison, N. J. To obtain this field testing, Adamas furnished Grade D tips to representative groups of large metal-working plants, then free tips were given to a group of carbide toolmakers for use by them on jobs where increased production and longer tool life were required by customers. Reports from both groups were enthusiastic, particularly in

## CHICAGO "SAFETY PLUS" SOCKET SCREWS MAKE YOUR PRODUCT BETTER 4 WAYS

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There is a Chicago "Safety Plus" Product designed to give you a tighter, lower cost fastening for ANY heavy duty purpose.

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**The CHICAGO SCREW COMPANY**  
2507 WASHINGTON BLVD., BELLWOOD, ILL. • Established 1872

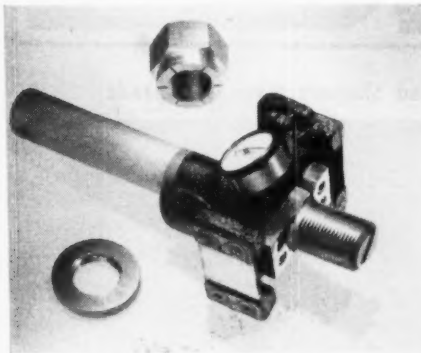
regard to the uniformly high and consistent performance records established.

Adamas Grade D Carbide is designed for general purpose machining of steel. It can be used on both interrupted cuts and roughing cuts. The good edge wear combined with toughness gives this carbide a wide range of applications.

Considerable attention was attracted by the exhibit at the recent ASTE Tool Show where, for the first time, Grade D was offered to the metalworking field in its entirety. Free tips were offered for use on difficult jobs for comparative trials. This offer was so well received that the manufacturer has decided to extend this offer to any metalworking plant desiring to run its own steel cutting trials.

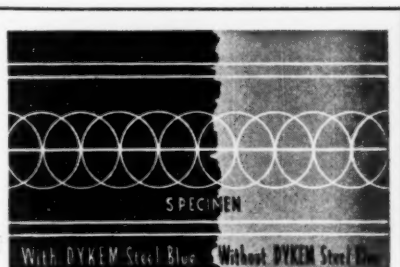
### Bryant Thread Gage Redesigned

The Bryant Chucking Grinder Co., Springfield, Vermont, announces the re-design of their Portable Internal Thread Gage. This device is used for the inspection of internal threads in a range 5/16" to 1", either National Coarse or National Fine.



In principle, this gage functions as a split plug gage. The plug is collapsed by a thumb lever, inserted into the threaded hole, and allowed to expand. The apparent size of the thread is shown on a dial indicator. Interchangeable segments can be furnished to cover a wide range of thread sizes. These segments all fit the handle mechanism.

Actual tests have shown that this gage will check parts from four to five times faster than the standard plug gage, according to the manufacturer. It is easier to use than the plug gage and will give a quantitative reading. The new gage is 50% lighter than the old model, weighing approximately 14 ounces.



### DYKEM STEEL BLUE STOPS LOSSES making dies & templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

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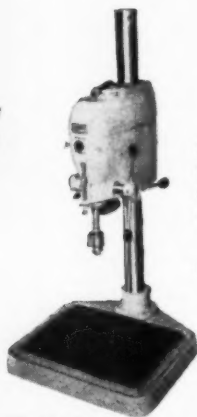
# PRECISION DRILLING

up to  $1\frac{1}{2}$ "

**Electronic Motor Control**

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SMALL HOLE DRILLING**  
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Speed - Right Manual and air feed drilling machines feature controlled uniform spindle speeds 1000-10,000, 25,000-15,000 RPM.

Priced from \$124 complete.



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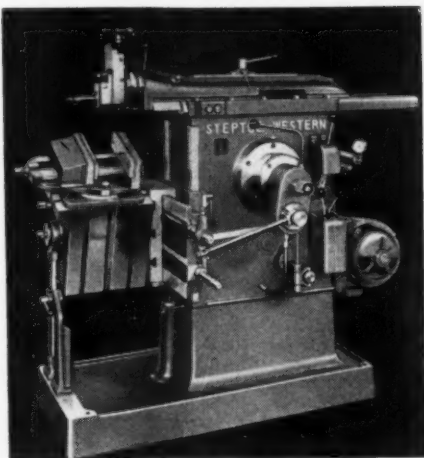
## New Steptoe-Western High Speed Shapers Have 18 Speeds

An additional line of 18-speed, all geared, High Speed Shapers, in 12" and 15" sizes, is announced by the Western Machine Tool Works of Holland, Michigan.

It is now possible to obtain a speed and feed combination in a mechanical shaper to suit any material, due to a selection from 18 all-gear speeds, up to 200 strokes per minute in progression, with eight automatic feed rates.

Steptoe-Western High Speed Shapers are equipped with either plain or universal revolving tables. Tables have a horizontal travel of  $19\frac{1}{2}$ " and vertical travel of  $12\frac{1}{4}$ ", and are provided with planed tee slots on three sides, with a supplemental vertical vee in one side surface for holding round work. Universal tables may be clamped in any angular position indicated on the large graduated dial.

The base is a rugged, semi-steel ribbed casting, of extra depth for rigidity, with a depressed top for easy cleaning. A heavy box casting, containing all the drive gearing, forms the column. All sliding surfaces are planed and hand-scraped to master surface plates. An



opening in the column has been provided for keyseating long shafts through the column. The helical bull gear and pinion, and all shafts, are mounted on heavy duty Timken bearings. Patented



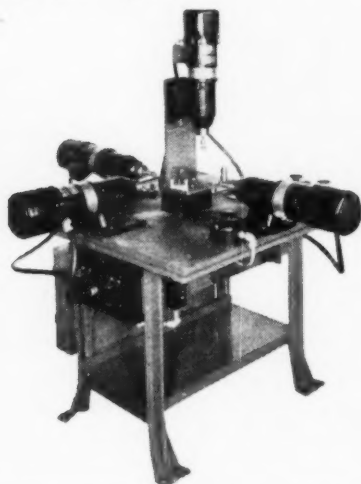
forced feed lubrication is provided to all bearings, ram, and gears, the latter being of alloy steel.

All speed changes are through sliding gears, on involute splined shafts, assuring constant horsepower at the ram, without the losses of belted variable speed mechanism. The rigid vee type ram is adjustably gibbed, planed, and hand-scraped to master gages. A heavy duty tool head, for  $1\frac{3}{8}$ " x  $\frac{5}{8}$ " tool shanks is mounted on the ram, has a 6" travel and angularly adjustable 60° each side of center by graduated scale.

Micrometer dials are provided for all feed motions. A heavy duty 10" swivel base vise, with replaceable hardened and ground steel jaws, graduated and adjustable for 180°, is standard equipment. Jaw depth is  $2\frac{1}{2}$ " and maximum opening is  $9\frac{1}{8}$ ".

### New Tapping Machine Has Wide Adaptability

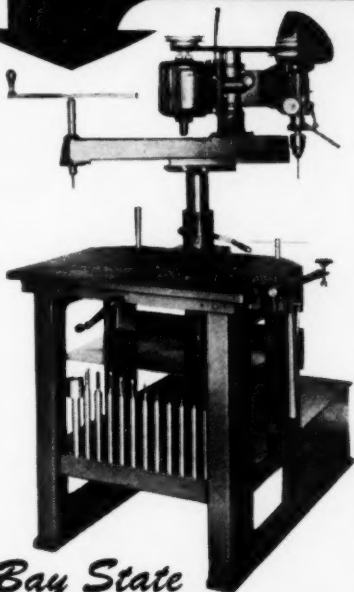
A new tapping machine that is in reality several tapping machines combined in one, has recently been announced by the Govro-Nelson Co., 1933 Antoinette Ave., Detroit 8, Mich.



Incorporating four standard Model "KT" Govro-Nelson Tapping Units which can be positioned according to the parts that are being tapped, the machine can be used to perform tapping on four different parts, tapping two to four holes simultaneously in each part.

The unit is suitable for a great variety of parts. Its versatility enables it to per-

**NOW! YOU CAN  
SAVE 75% OF  
YOUR HAND DRILLING  
AND TAPPING TIME**



### *Bay State* **DRILLING & TAPPING MACHINE**

It's always ready . . . just swing the drill or tap head into position and drilling or tapping is quickly and accurately done over any part of work.

A lower table is provided in back of machine for larger work, also a plate at right angle to table for drilling and tapping work on end.

Taps are held square and rigid, giving positive drive. Taps instantly available in separate hardened and ground spindles . . . no lost time searching for taps.

Special large range clamps available for securing work to table. Accessories also available for threading studs or rods.

#### **PRICED EXCEPTIONALLY LOW**

For simplicity of operation, speed and quality workmanship, no machine equals the BAY STATE.

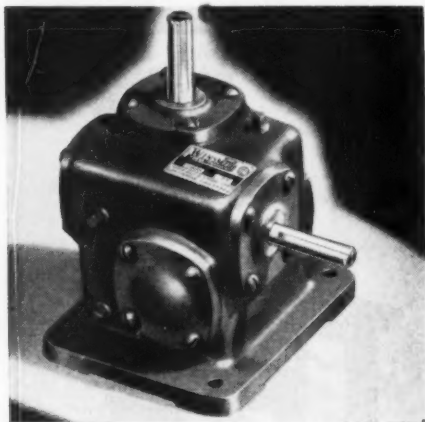
Write for complete descriptive literature.

**BAY STATE TOOL & MACHINE CO.**  
412-7 ALBANY ST., SPRINGFIELD, MASS.

form tapping operations that ordinarily required the building of a separate special machine for each individual part, according to the manufacturer.

### Winsmith F.H.P. Speed Reducer

To serve fractional horsepower, small space requirements, Winfield H. Smith Corp., Springfield, N. Y., introduces a



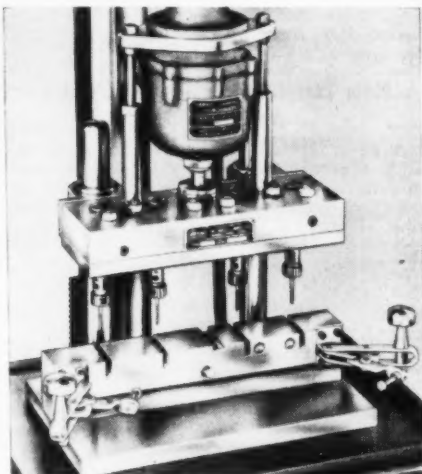
double reduction speed reducer, designated Type DBRA. This new unit is designed for a wide variety of duties in the transmission of small power loads, and is stocked in 24 different right angle drive assemblies.

Totally enclosed in a single piece, compact housing, the DBRA offers a range of from 1/20 to 1/4 h.p., and reduction ratios of 25:1 to 1764:1. This range of speed and power, the manufacturer claims, eliminates the necessity for using bulky speed reducers that include h. p. ratings from 50 to 100 times greater than required.

Although the DBRA was originally designed to serve the requirements of moving displays loaded with up to 1500 pounds of appliances and other merchandise, its versatility affords endless applications, according to the manufacturer. New illustrated 4-page folder HW 150, with complete design and application data, is available.

### The Jarvis Multi-Tapper for Production Tapping

The Charles L. Jarvis Company, Middletown, Conn., announces a new Jarvis Multi-Tapper for multiple tapping and drilling in mass production lines.



This new device features a silent roller chain to transmit power from the Torqomatic drive unit; this chain withstands constant friction and can absorb the tremendous shock loads due to continuous

## CUT YOUR MICRO-DRILLING COSTS

with precision ground and lapped MICRO-DRILL full-length GUIDES.

For No. 80 to 3/32" drills 3/32" to 3/16" body sizes.

We will also micro-drill your parts.



## MICRO DRILL GUIDE

AND

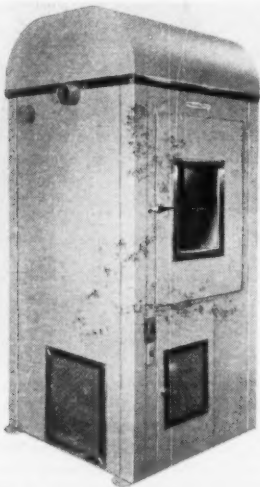
ENGINEERING COMPANY • DETROIT 28, MICH.  
18515 WEAVER VE 7-8751

forward and reverse action. Less wear of gears, quiet operation and increased production at lower cost is claimed by the manufacturer. The number of spindles is limited only by the size of tap or drill and the work.

Coupled with the performance of the torque-driven Torqomatic it is said that the new Jarvis Multi-Tapper offers unusual production economies.

#### Drying Unit for Small Articles

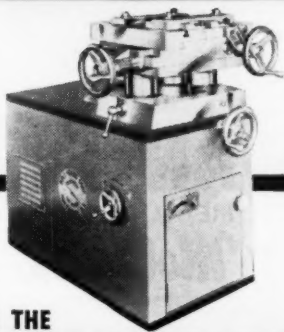
A practicable drying unit called the Technidrier transforms polished metal surfaces from cold water rinse to sparkling dry in less than two minutes. It is a recent product of Technic, Inc., 39 Snow St., Providence, R. I. The surfaces when dry are both scratch and stain free. Labor and time saving features of this unit include elimination of rejects due to staining, omission of alcohol and hot water rinses, ease of putting work in and taking it out, complete visibility of work in process through the glass door, as well as simple installation and operation.



The Technidrier is equipped with adjustable spindles which are mounted on a turntable, so that work can be removed or put into the unit without disturbing other work in the process of drying. There are ten 14" spindles with a clearance of 14"; they are adjustable to handle work up to 28" on five spindles, the combination accommodating either ten 14" x 14" racks or five 14" x 28" racks.

July, 1950

## SPINDLE AND CUTTER ARE DOWN UNDER



ON THE

## *Electrix...* PRECISION DIE MILLER

The ELECTRIX PRECISION DIE MILLER is designed to mill inside and outside shapes such as blanking dies, draw dies and cams. Milling of complicated die and cam outlines is reduced to minutes with the ELECTRIX PRECISION DIE MILLER.

Actually see complicated outlines milled in minutes — NOT HOURS.

Inverted infinite speed precision spindle from 200 RPMs to 3600 RPMs—New Departure sealed for life bearings—Counter balance fly wheel—assuring smoother finish and longer tool life.

For Particulars Write

**ROLL FEEDS CORP.**  
PAWTUCKET . . RHODE ISLAND  
Builders of "FFC" Roll Feeds

235



# WANTED!

TOUGH METAL CUTTING JOBS

BY *Molyflex*

## STAR'S NEW SHATTERPROOF HIGH-SPEED BLADES

Eat their way . . . easier . . . faster . . .  
through any metal cutting job you may  
have!

In recent tests these hand blades averaged 23.8% more metal cut than all leading brands tested. Absolutely shatterproof! A cinch to help you cut costs and speed up those tough metal cutting jobs.

### STAR STEELRITE METAL MARKING CRAYONS

Try Star's new metal marking crayons. Ideal for use on hot, cold, damp or grimy metal. Withstand pickling, yet do not affect enamel application.

Star's Metal Cutting Booklet and Wall Chart are yours for the asking and will help you get top efficiency from hack saw blades.

5832



## CLEMSON

BROS., INC.

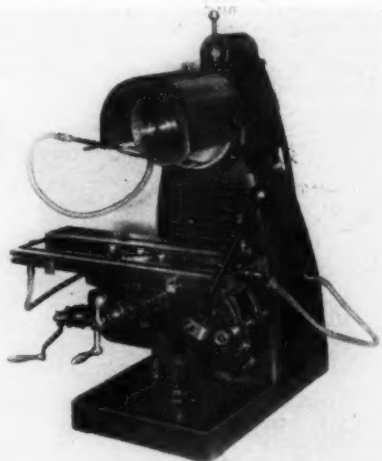
Middletown, N. Y.

Makers of Hand and Power Hacksaw Blades, Frames, Metal Cutting Band Saw Blades and Clemson Lawn Machines.

## Bench Type Carbide Tool Grinder

A new bench-type, universal carbide tool grinder designed especially for use with diamond wheels of all types is announced by Wickman Manufacturing Co., 15531 Woodrow Wilson Ave., Detroit 3, Mich. It can be used as a surface grinder, a chip breaker grinder, and a universal tool and cutter grinder.

This machine is provided with both a swivelling table and swivelling motor with micro setting scales for accurate grinding and resharpener of cutters, reamers, counterbores, etc. It is powered with a special 2850 r.p.m., 1 h.p. reversing motor which is said to be completely free of vibration. The motor can be reversed by a lever switch on top as many as 70 times a minute without harming the windings.



The grinding wheels are mounted directly on the 1 1/4" ball bearing spindle or on either of two adaptors which give spindle extensions of 2 1/8" and 5 3/8". Motor and wheel can be accurately set in any position 20° either side of vertical center.

Lever and hand wheels in front of the machine provide vertical, longitudinal and transverse table movement. Micro-scales are incorporated for close settings and the table has two T-slots for adjustable stops. Standing 31 3/4" high, the grinder requires a 30" x 30" area. The table size is 17" x 5". Dust covers protect all sliding surfaces.

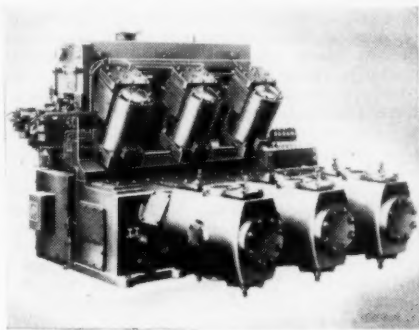
## Ingersoll-Rand Gas-Engine-Driven Compressors

Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y., has introduced a new line of gas-engine-driven compressors, available in three sizes—110, 165 and 220 horsepower. These machines consist of 4, 6, and 8-power cylinders respectively, having an 8¼" bore, a 9" stroke and two power cylinders for each compressor frame.

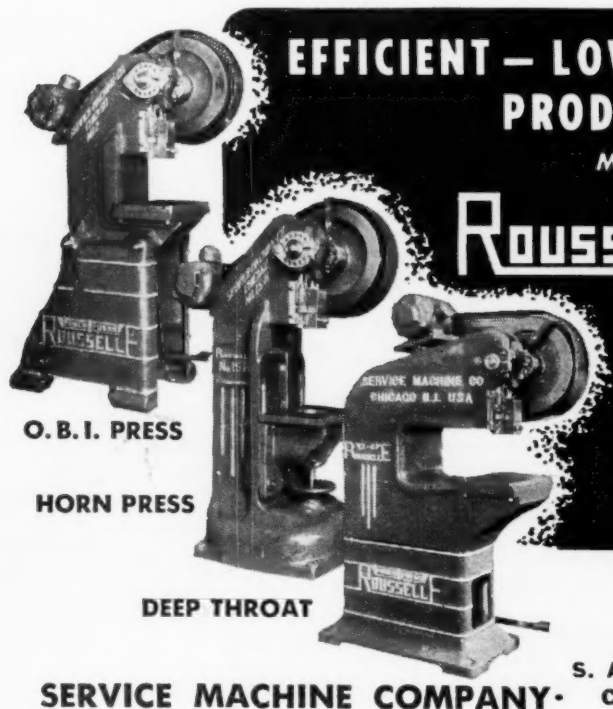
The JVG is a small, compact compressor of the I-R, 4 cycle, V-angle design, having the power connecting rods articulated with the compressor rods. It is said to be well balanced in operation and light enough to meet all requirements for semi-portable use in the field, yet built for the top efficiency, conservative rating, long life and low maintenance which are usually demanded in a permanent installation.

The flexibility of cylinder arrangement for loading the engine under any pressure and service conditions is remarkable. The JVG is claimed to operate quietly, running like a steam engine. Simplicity and compactness in design are said to

result in simpler operation and lower maintenance costs. Form 3127-A contains a cross-sectional view and details per-



taining to construction features as well as a list of uses to which the JVG is suited.



**EFFICIENT — LOW COST  
PRODUCTION**

MEANS

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**7627-33**  
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**Chicago 20**

**SERVICE MACHINE COMPANY •**

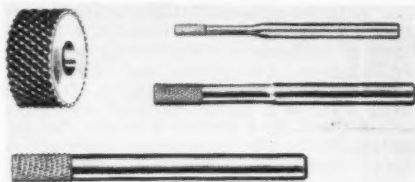
## Carbide Grinding Tools Cut Small Part Grinding Time

A group of carbide tools that is said to be finding wide application for the internal and jig grinding of small holes in both soft and hardened steels (up to Rockwell C-65), as well as in other engineering metals, are carbide grinding tools similar to those shown in the illustration below. Made of solid Carboloy cemented carbide, these tools are said to hold size, produce a fine finish and last longer than conventional grinding wheels. They are a recent development of Carboloy Co., Inc., 11139 E. 8 Mile Road, Detroit 32, Mich.

In one shop, average production on the internal grinding of hardened steel collets (Rockwell C-62 to C-65) was between ten and twenty units per wheel, with abrasive type wheels. Sometimes only two or three collets could be obtained per wheel; the time required to grind each collet averaged five minutes. Grinding tools made of Carboloy cemented carbide cut grinding time to two minutes per unit, and 218 collets were finished with one tool. The tool was then re-sharpened at small cost. Downtime of equipment obviously was also reduced.

In another shop, it took five hours and

six conventional grit wheels to locate holes on a particular drill jig. The same job was performed in 17 minutes with a



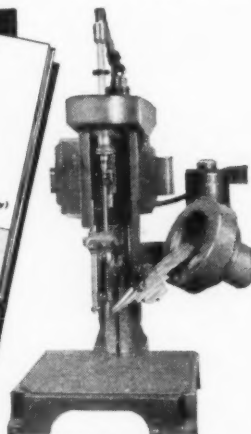
carbide grinding tool. The tolerance maintained for hole location was also within .0002", an accuracy said to be previously unobtainable.

## Compressed Air Cooling Unit

For firms using small quantities of compressed air but who must nevertheless have it delivered to use cool and dry, Jas., A. Murphy & Co., Inc., 5th & Vine Sts., Hamilton, Ohio, has made available a line of small, vertical after-coolers.

Designated the Murphy Type V-907

**THIS NEW  
CATALOG**  
*has all  
the Answers.*



MODEL A  
BENCH TYPE

*to Your*

## PRODUCTION SCREWDRIVING PROBLEMS

It's alive with illustrations and descriptions of invaluable time-saving aids: **POWER SCREWDRIVERS** that drive all types of screws as fast as one a second, without stripping of threads or marring of heads, all driven to uniform tension, 3 models . . . Also Fixtures, Nut Drivers, Hopper Units and Special Assembly Machines. Modern necessities that will materially cut production costs.

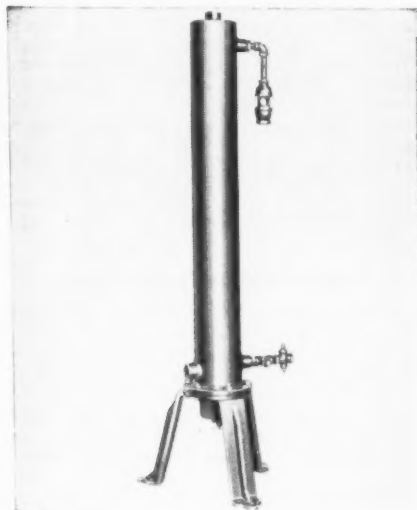
*Write Today  
for CATALOG*

**DETROIT POWER SCREWDRIVER CO.**

2809 W. FORT ST.  
DETROIT 16, MICH.



Aftercooler, the line comprises two sizes. The smaller size measures 30" overall, with legs as shown below; it cools up to 20 cu. ft. of air per minute. The larger



size measures 48" overall and cools 30 to 50 cu. ft. of air per minute. Air inlet and outlet pipe sizes up to 1" may be specified by the purchaser of either of the two units.

The Type V-907 is made up of an outer steel shell of correct size for the required capacity, which encloses a tube nest through which the cooling water passes. Hot air entering the cooling chamber is guided slowly about these cooling tubes from the intake at the bottom left to the outlet at the top center. Separated moisture drops by gravity to the trap below the bottom head, from which it is ejected as it is collected. The water inlet is shown at the lower right of the unit, and the water outlet, with sight-drip connection is shown at top right.

Appointment of **T. J. Roberts** as Houston District Manager of the Johns-Manville Industrial Products Division has been announced by **C. G. Dandrow**, Johns-Manville vice president and sales manager of the Industrial Products Division. At the same time, Dandrow announced the promotion of **Henry G. Palmer** to the post of Atlanta District Manager of the Industrial Products Division, succeeding Roberts.

**New Universal Joint!**

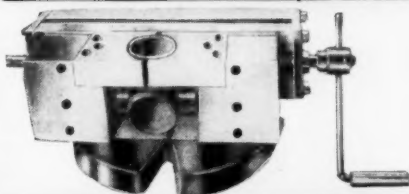


"...The Ball & Socket Joint with the Toggle Action"

**Write For Folder!**

**B. M. ROOT CO.**  
YORK, PENNA.

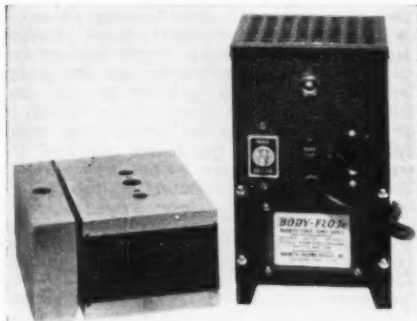
Over 350 Manufacturers Use  
**"JOHN'S" DRILL JIGS**  
Many Plants With 40 To 50  
In Constant Use  
**CAN YOU AFFORD**  
To Be Without One  
**?**  
**INVESTIGATE**



Write To  
**HEUSER MFG. CO.**  
1638 N. Paulina St. Chicago 22, Ill.

## Magnetic Chuck Holds Through Body of the Work

As a useful accessory for small surface grinders, Body Flo Jr., a 6" electro magnetic chuck and power supply unit, has been developed by Magnetic Holding Devices, Inc., 2034 East 22nd St., Cleveland 15, Ohio. The Body Flo Jr. magnetic



chuck measures 6" x 4" x 2-15/16" with a companion steel parallel of the same length. The power supply unit is 4 1/2" x 4 1/2" x 8", has a copper sulfide rectifier, convection cooling, Mag-Demag switch,

and an input of 110 volts a. c., output of 6 volts 4 amps. d. c.

The Body Flo Jr. is stated by its manufacturers to be a cost-reducing tool which holds small or large work, horizontal, vertical or angular set-ups, and magnetically holds itself to the worktable, or may be bolted to the T-slots. The Body Flo magnetic principle consists of magnetism directed through the body-of-the-work.

Features include a 6" unbroken line of magnetism in the magnet that permits grinding uniformly parallel sides, holding work as thin as .011"; and in the power supply unit, a Mag-Demag switch with automatic return to the "off" position.

## New Automatic Bar Feed

A new, completely automatic Bar Feed for hand and automatic screw machines and turret lathes has recently been introduced by OK Specialty Co., Inc., 910 W. Lake St., Chicago 7, Ill. The manufacturer states that this automatic feed method will increase production, and considerably reduce labor and repair costs.

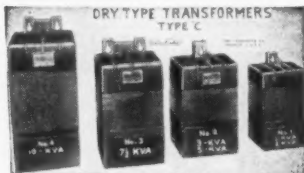
The OK Specialty Bar Feed is con-

## EISLER TRANSFORMERS



We manufacture all types of transformers, sizes from 1/4 to 500 KVA. Air, oil, or water cooled for distribution, lighting, welding, furnace, phase changing rectifiers, auto, etc.

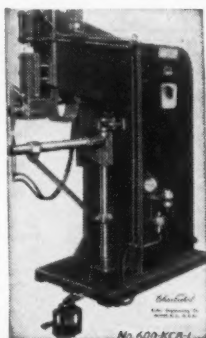
Special transformers built to Customers Specifications. **EISLER Transformers conform strictly to NEMA, ASA and AIEE standards.**



## EISLER WELDERS SPOT BUTT GUN ARC

For all types of welding in sizes: 1/4 to 300 KVA. Foot, air or motor operated.

*We invite contract spot or butt welding in large or small quantities.*

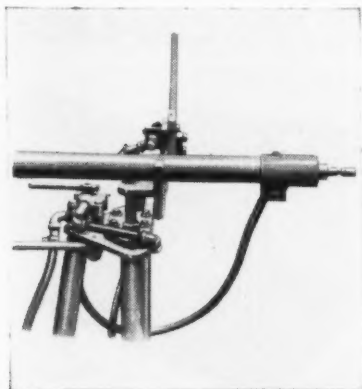


Air operated Press Type Spot Welders (made from 5 to 250 KVA)

**EISLER ENGINEERING CO., INC.**  
762 South 13th St., (Near Avon Ave.)

Chas. Eisler, Pres.  
Newark 3, N. J.

structed to handle 12-foot stock bars of all shapes and diameters, and will feed any required length to the stop. It is limited only by the i.d. of the machine tool spindle. It permits the use of the



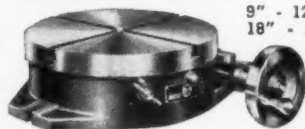
exact size polished stock, thus saving additional operations. The Bar Feed tube is adjustably mounted on two substantial tripod standards. Operating on very low air pressure, a  $\frac{1}{4}$  h.p. compressor will

handle many such units. The Bar Feed is especially useful for feeding polished steel and brass, and aluminum rod, thin-wall tubing, plastics; round, square, hexagonal and rectangular shapes, etc.

Automatic feeding results when the pneumatic feed tube positions and aligns a stock bar into the machine tool spindle. Air pressure therefore, does the work formerly done by the operator or mechanical feeding devices. The Bar Feed employs a plunger which automatically enters, and is pneumatically withdrawn, from the machine tool spindle, on all models. Since this plunger stops just short of the collet jaws, the final stub is not pushed out of the collet to damage tools. Waste due to long ends is eliminated. Feed fingers and feed tube, feed latch assembly and all other types of feeding attachments can be eliminated.

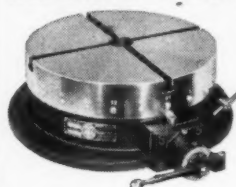
A special safety device shuts off the air pressure when the feed tube is in the reloading position. Only when reloading is completed, and the feed tube is totally locked in feeding position by a control lever, is it possible to turn on pneumatic power. Reloading is quickly done by changing the air control valve which automatically withdraws the plunger from the machine spindle.

## TROYKE ROTARY TABLES WORM WHEEL OPERATED ROTARY TABLES . . .



9" - 12" - 15" -  
18" - 21" - 25"

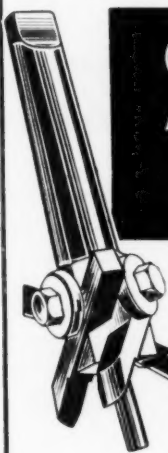
## BALL BEARING STATION INDEXING TABLES . . .



12" - 15" - 18"

See your  
dealer or  
write for  
Catalog 14

TROYKE MFG. CO.   
CINCINNATI 9, OHIO, U.S.A.



**Co Clark**

**ADJUSTABLE  
HOLE  
CUTTER**

Finished cuts the first time in boiler plate, pipe, plastics, hard fibre, stainless steel, Transite, etc. 7 models cut variable expansions from  $\frac{3}{8}$ " to 5" holes, with thickness capacities from thin sheets to 1".

**ROBERT H. CLARK COMPANY**  
Beverly Hills, California

Manufacturers of Precision Cutting Tools

## Standard Twin-Motor Snagging Grinder

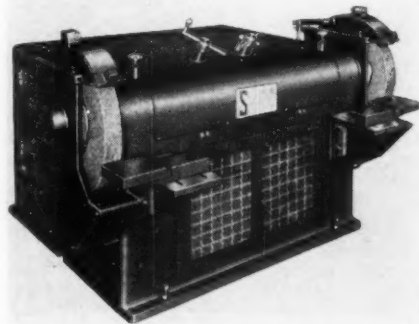
A new Twin-Motor Snagging Grinder is introduced by the Standard Electrical Tool Co., 2486 River Road, Cincinnati 4, Ohio.

This No. 55 Double End Grinder is a 2-in-1 machine; each operator is independent of the other; one side may be stationary while the other wheel is operating; one side may be operated with a wheel differing in diameter to the other side, while each wheel operates at its correct and peripheral speed.

The grinding wheel on each side is powered by an individual motor having its own magnetic starter and separate start-stop push button station, shaft lock for use when changing wheels, and independent infinitely variable speed drive. As the individual wheel reduces in diameter as little as 1/32", turning of the crank handle at top front of the machine simultaneously adjusts the guard for maximum protection and increases the spindle speed in direct relation to the worn wheel diameter. This means of consistently changing the speed permits maintaining exactly 9500 s.f.p.m. throughout wheel life. The important factor in making a speed change is that no tools

and wrenches are required; the operator simply turns the individual crank handle.

Each spindle assembly is mounted in heavy duty ball bearings, with large size



oil reservoirs and visual oil gauge. The flanges for large hole wheels are of plate steel accurately machined and balanced. The emery wheel guards are

**WORLD WIDE ACCEPTANCE SAVES TIME AND MONEY**

**STAR DUST**

**LAPPING COMPOUND**

**NOW YOU MAY SOLVE YOUR LAPPING AND POLISHING PROBLEMS**

**With either of THESE TWO TWINS**

**STAR DUST DIAMOND POWDER**

One of the outstanding abrasive accomplishments of the war. Exclusive crushing and laboratory grading methods make STAR DUST the most accurately graded abrasive ever produced. Available in all grit sizes and as fine as .0001", far beyond the smallest "mesh" heretofore produced by conventional processes. Must not be confused with so-called "diamond dust".

*Indispensable for Molds, Dies, Carbide Tools, etc.*

**STAR DUST LAPPING COMPOUND**

Every tube is ready to use as delivered. Each tube contains the most efficient density of STAR DUST diamond particles for each grit size. "Ophthalmic" tube with extremely fine nozzle delivers minimum compound required. No waste. No contamination. Easy to apply. Easy to clean up. Surface finish of less than half a micro inch is easy.



The  
POWDER  
dry  
—in vials—  
for mixing  
with your  
own carrier



The  
COMPOUND  
—in tubes—  
ready-mixed  
for  
convenience

**ACE ABRASIVE LABORATORIES**

250 W. 57th Street

• New York, N. Y.

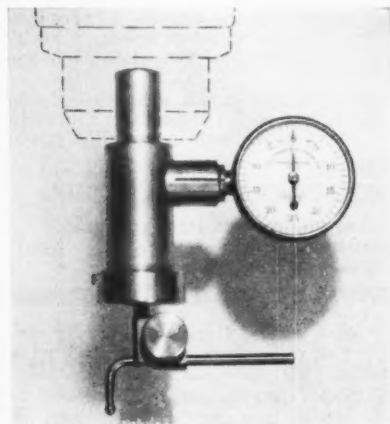
made according to the Safety Code of American Standard Association, of structural plate steel, adjustment to compensate for wheel wear, with the exhaust outlet remaining stationary.

A safety interlock prevents over-speeding of the individual grinding wheel. Openings at front and rear of base with removable covers give accessibility to either motor or drive without interfering with the operator on the opposite side.

The No. 35 Grinder with two 7½ h.p. or two 10 h.p. motors for 24" dia. x 1½" to 4" face x 12" hole Resinoid Bond Grinding Wheels has a distance between wheels of 51" and size of base at bottom of 48"x40". The No. 55 h.p. Grinder with two 15 h.p., two 20 h.p., or two 25 h.p. motors for 24" or 30" diameter x 1½" to 4" face x 12" holes Resinoid Bond Grinding Wheels has a distance between wheels of 66½", and size of base at bottom of 60"x55". The new weight ranges from 2915 to 5310 pounds.

### New Dial Center Finder

This rigidly constructed, yet sensitive indicator for locating work pieces on jig borers, milling machines, radial drills or lathes, is a recent development of the Waltham Dial Gage Co., Stow, Mass. It can be used to indicate external, such as a toolmaker's button, or can be used to indicate from a hole in the workpiece by removing the feeler rod



assembly. The point on the center spindle can be used to indicate from a prick punch mark or drilled center making it a useful device for face plate or chuck work on a lathe.

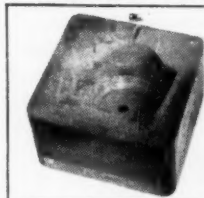
July, 1950

## SMASH! HEAT TREATING PROBLEMS SLASH! HEAT TREATING COSTS

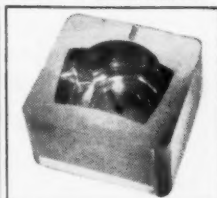
with... **PHOENIX BRAND**

### NON SCALING COMPOUND

Originally produced for use in Parker's own plant to prevent scale formation and decarburization during heat treatment of tools and dies, PHOENIX BRAND NON-SCALING COMPOUND proved so successful it is now being offered commercially to industry. Not a salt solution but a specially compounded powder for use in hardening and annealing of steels — tested and proven in hundreds of hardening rooms, PHOENIX BRAND NON-SCALING COMPOUND pays it's way in time and money saved. Obtain increased furnace capacity and production! Recommended for steels hardening up to 1750 F. and for use in all furnaces except bath type. TRY IT . . . discover for yourself the amazing results obtained in time and money saved using PHOENIX BRAND NON-SCALING COMPOUND.



This can be prevented! Note scale, pitting and decarburization . . . a result of normal heat treating. Time can be saved, furnace production increased, costly polishing after heat treating can be virtually eliminated. ORDER FROM MILL SUPPLIER OR WRITE TO ADDRESS BELOW



This unretouched photo shows clean, smooth surface after heat treating using PHOENIX BRAND NON-SCALING COMPOUND. You too can benefit in time and money saved, eliminate scale, pitting and decarburization.

A Product of:

*Parker*



**THE PARKER STAMP WORKS, Inc.**

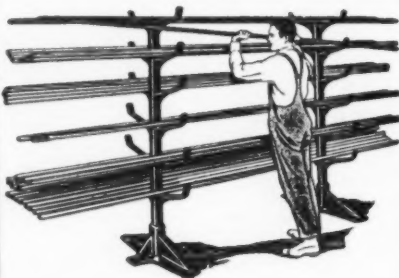
Established 1871

**HARTFORD, CONNECTICUT**



## HOW YOU CAN BOOST YOUR PROFITS

The BROWN TIME-SAVING RACK saves the time previously lost end-hauling each bar of stock its entire length from the old-style, closed-side Rack, the Brown Rack requiring but a few inches of side movement. Each length, width and thickness of stock is displayed in gold-fish visibility for instant selection. Workmen waiting for stock are served without waste of time, and returned to their production machines to turn out a maximum of output.



Any time you require additional storage space, all you need do is to add more units. If you want to relocate it at any time, you can do so quickly for it is unattached to the building. It is a simple, durable article made of metal in five styles. It can't burn, warp, sag or twist; depreciation is practically nil.

SEND FOR BULLETIN No. 26-B DESCRIBING THE BROWN TIME-SAVING RACK.

### BROWN ENGINEERING CO.

126 N. THIRD ST. READING, PA.

RACKS • VISES • CLUTCHES • COUPLINGS

This tool is rugged and compact, making it possible to work close to the machine spindle nose, thus eliminating the need to move the knee or saddle of the machine after work has been located. The dial is attached with a friction fit which allows turning for convenient reading and may be detached for use as a regular dial gauge indicator with a range in .100".

### Whiting Electric Chain Hoists

A complete, improved line of Whiting electric roller-chain hoists has just been announced by the Whiting Corporation, Harvey, Illinois. The redesigned hoists retain the totally enclosed, double worm-gear drive of previous models; in addition, many parts have been simplified and strengthened.

The hoists use a spring-set, shoe-type motor brake, in which the lining is bonded to the shoe. This arrangement is said to provide improved braking power and longer brake life. The pull cord has been relocated at the center of the hoist frame, to eliminate any tendency of the hoist to tip when the control cord is pulled.

The hoist control switch also is relocated and simplified, and protected from damage by a new switch mounting. The switch wiring is readily accessible by removing the hoist nameplate. The motor brake is also easily accessible for inspection and repair.

Perfect alignment of the motor is insured by locking the adaptor casting into position. In the two-ton hoists, a built-in hook provides 2½" reduction in headroom.

These Whiting Hoists are available in ¼, ½, 1, and 2-ton capacities. Bulletin H-112, describing them in detail, is available.

### CASTING-FORGING QUIZ

Answers to quiz from page 106.

1. Shot against a casting
2. Gate
3. Impression of a forging
4. A die impression in material
5. Portion of die which distributes metal
6. Part of stock by which operator grips stock
7. Provision for the overflow of metal
8. A holder to support starting part of casting
9. Rolling forging in pair of dies
10. Section which would lock themselves into die impression



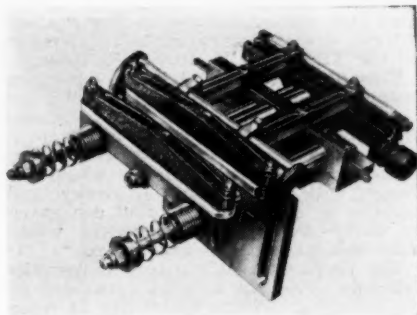
## Feedmaster Speeds Automatic Stock Feeding

Several new improvements added to the Feedmaster Automatic Air Feed have been announced by Great Western Tools Inc., 3811 Riverside Drive, Burbank, Cal. The Feedmaster operates on punch presses, spot welders, drill presses, etc., feeding coiled or strip stock of almost any size and shape up to 18" wide and up to a 12" stroke.

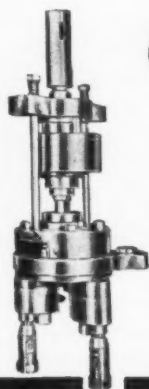
All Feedmaster movements operate pneumatically; an air actuated feed head pulls the material through the machine and a hold head, also actuated by air, holds the material while the feed head returns to reload position. In order to insure positive movement of the stock, gripping capacity of the improved feed head has been increased by 50%. Springs added on the bar-supports now absorb shock load, improving over-all machine life. The hold head which always operates in a fixed position is now securely clamped to the bar supports; this mounting is more rigid and eliminates all possibility of movement, even over protracted use.

The Feedmaster operates at over 200

strokes per minute at high accuracy. Its simple operation is controlled by a cam-driven air valve, or can be operated from the ram.



The Feedmaster can be used with plain, compound, or progressive dies, mounting either on the die or to the machine, either side, front or back, push or pull, by means of the angle brackets provided. Set-up time is only a matter of minutes.



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Sizes : 0 - 10 Tap to 5/16"  
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No. Spindles: 2 to 6

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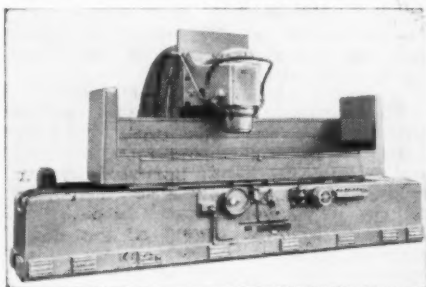
### Thompson Hydrovert Surface Grinder

The limitations of the fixed column vertical surface grinder as to width of work and obstructions, or multi-level production work, are overcome in a new machine introduced by the Thompson Grinder Company, Springfield, Ohio. This new sliding column vertical surface grinder with reciprocating table is known as the Thompson Hydrovert Grinder.

This new unit is said to provide more economical production where there are requirements for wide flat surfaces without limitations ordinarily determined by the size of the grinding wheel. The Hydrovert can use a smaller wheel for deeper cuts and grinding efficiency, and because of the sliding column can move to cover work many diameters wider than the largest grinding wheel.

The Hydrovert sliding column permits grinding close up to shoulders, and in die grinding, affords flexibility of head action to get around guide pins that would prevent such work on a fixed column vertical grinder. In addition, it makes possible the grinding of flat surfaces in various steps or levels. These multi-level surfaces are precisely ground regardless of interference of other obstacles which would ordinarily limit production work on a vertical machine.

The Hydrovert column travels back and forth on a sub-base, giving either an intermittent feed at each reversal of the table, or a continuous cross feed, both from a single lever operation. The



machine is also equipped with hydraulic hand cross feed for rough setting of the wheel and for grinding close to obstructions or shoulders. The size range is from 16"x24"x48" to 48"x24"x192".

On the Thompson Hydrovert a smaller wheel is used, with intermittent cross feed to give the full range of capacity. This allows the use of a harder wheel and the taking of a greater depth of cut.

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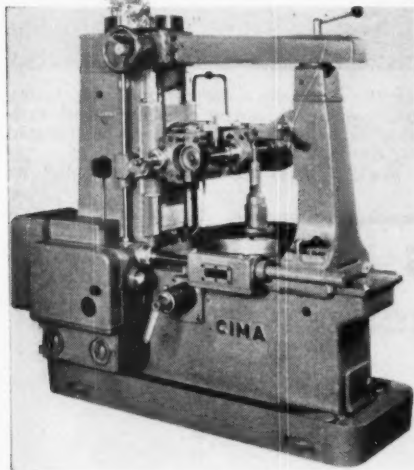
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Makers of Standardized Jig & Fixture Bushings  
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THE SERVICE SHOP TO INDUSTRY FOR MORE THAN 25 YEARS

The coolant on the machine is applied inside the wheel as well as outside the wheel to provide free clean cutting of the metal. The machine can be equipped with automatic down-feed, magnetic chucks, rectifiers, and Neutrol demagnetizing switches. The manufacturer invites vertical spindle grinding problems on which estimates and complete machine quotation and specifications can be supplied.

### CIMA Gear Hobbing Machine

As already mentioned in past issues of the *Machine and Tool Blue Book*, George Scherr Co., Inc., 198 Lafayette St., New York 12, N. Y., has introduced several fine European machine tools and instruments to the American industrial market. Among these is the CIMA Gear Hobbing Machine, pictured below.



This fine machine tool is a universal type which will cut spur gears, spiral gears and worm gears. The cutter head is provided with a slide which feeds a tapered hob tangentially. This method is essential for generating worm gears with multiple threads in order to avoid ridges and flats on the side of the teeth, unavoidable when cutting such gears with the ordinary infed.

Another special advantage of this unit is that simple, easily made fly cutters may be used for generating accurate worm gears for which no hob is available, or where the quantity of work would not justify the expense for a special hob.

July, 1950

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### LeBlond 25" Heavy Duty Engine Lathe

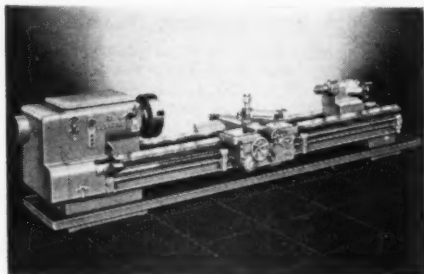
A new 25" heavy duty engine lathe, redesigned for more power, accuracy and economical operation, is announced by The R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio. The new 25" is known as the "1950 Series" and is provided with a 30½" swing capacity, 32 spindle speeds ranging from 5 to 602 r.p.m., 4-directional power rapid traverse, enclosed quick change box, hardened and ground steel bed ways, and automatic lubrication throughout the headstock, quick change box and apron.

More economical operation of the new LeBlond lathe is said to come from the new headstock which is built on the LeBlond "free-running" principle; gears not actually in use are cut out of the train, thus leaving more of the main drive horsepower free for machining. A four-bearing spindle mounting further contributes to smooth performance. The lathe is arranged for 25, 30, or 40 h.p., 1200 r.p.m. main drive motors, as required.

A 16-speed headstock with speeds ranging from 10 to 602 or 5 to 302 r.p.m. is available in place of the 32-speed head if required.

LeBlond engineers state that the 4-

directional power rapid traverse, furnished as standard equipment on the new 25", takes the work out of operating a lathe of this size. The electric motor built in the apron actuates cross and length traverse, and both are controlled by a single lever. Also, the tailstock can be "picked up" by means of a plunger on the carriage and moved



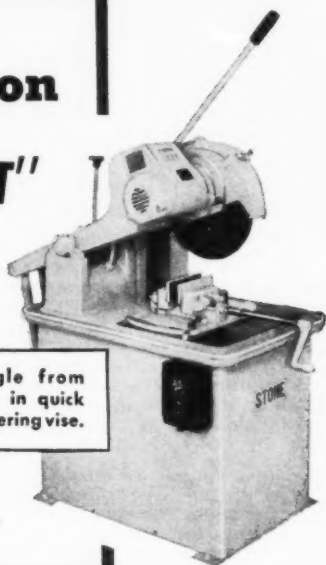
by the rapid traverse motor. Thus, heavy units such as apron, carriage and tailstock are moved faster and without strain on the operator.

Forty-eight feeds and threads may be

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● Cut all metals in any size or shape up to 3" solids and 4" pipe with milled-like finish to tolerances of .008. Examples—cut 3" angle iron in 8 seconds, 2" round cold rolled in 7 seconds, 1" tool steel in 5 seconds, 2" steel tubing in 5 seconds. Non-ferrous metals cut at even faster speeds with steel saws.

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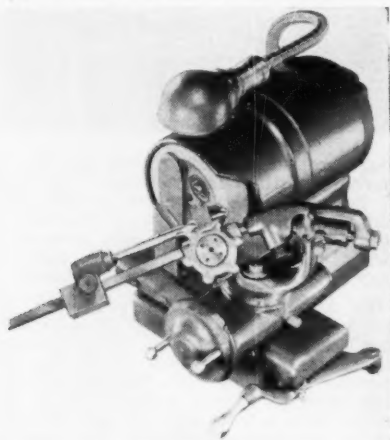
selected from the totally enclosed quick change box. Standard thread range is  $\frac{3}{4}$  to 46, and an optional range of  $\frac{3}{8}$  to 23 is also available.

The 1950 LeBlond line of heavy duty engine lathes also includes 12", 14", 16", 20", 32", 40", and 50" swing sizes. Complete information is contained in bulletin HD-153-A.

### Sellers Improved Drill Grinder

The William Sellers Division of Consolidated Machine Tool Corporation, Rochester 10, N. Y., announces its improved No. 1G Drill Grinder, a compact, bench-type unit embodying the basic principles and the accuracy of the Sellers Chuck and the Sellers method of drill grinding.

The new drill grinder is equipped with ball bearing slide, ball bearing swing frame and quick adjusting tail center, providing increased accuracy, reduced wear and further ease of operation.



This self-contained unit produces the Sellers Drill Point on any quantity of drills, in sizes as small as .028" (No. 70) and up to  $\frac{1}{2}$ " diameter. It provides theoretically correct drill lips, ground with the same inclination to the drill's axis, of equal length and with proper clearance at both the center and the periphery; this is the secret of the efficiency of the Sellers Drill Point.

The No. 1G Drill Grinder is designed not only to produce the Sellers Drill Point, but also to provide every convenience to facilitate its use by either skilled or unskilled operators and to provide high production capacity.

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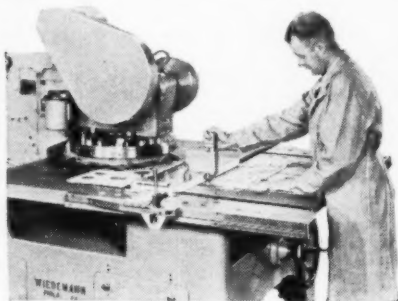
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### High Speed Turret Punch Press

The new RA-41P Turret Punch Press for high speed piercing of such work as electrical panels, switchboards, etc., combines the pantograph for rapid hole location with the turret for quick access to punches and dies. It has recently been introduced by Wiedemann Machine Co., 4265 Wissahickon Avenue, Philadelphia 32, Penna.

The turret of the machine carries 16 to 20 different punches and dies up to 3" diameter — round, square, shaped, or group. A convenient handwheel rotates



the turret to put any punch and die in piercing position in 2 seconds. The work to be pierced is clamped to the cross slide in proper relation to a template in which  $\frac{1}{4}$ " dia. holes have been accurately located to correspond with the center of each hole to be pierced in the material.

By a simple coding arrangement, all template holes representing the same size punch can be connected by a colored paint line to form a visual "chain" for the operator to follow with the stylus. The free-moving stylus is guided by the operator from hole to hole in the template, which accurately positions the material under the ram; the press is automatically tripped, but only after the stylus point has positively engaged the template hole.

The RA-41P press will handle sheets up to 28" x 40"; its capacity is 15 tons pressure, with an 11/16" stroke of the ram which operates at 175 strokes per minute, powered by a one h.p., 3450 r.p.m. motor.

This combination of rapid material positioning, and punch and die accessibility appreciably reduces piercing time of short and semi-production runs of sheet metal. Only one handling operation is usually required; close tolerances are maintained, and set-up time is practically eliminated.



### Push Broach Cuts Four Keyways In One Pass

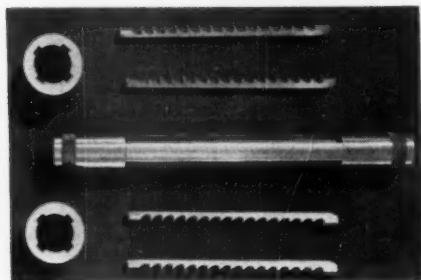
A new special push broach that will cut from one to four precision keyways in a single pass is announced by The Kase Machine Co., 18423 Buffalo Ave., Cleveland 19, Ohio. Designated LK-4, this tool is suitable for a wide range of applications in which up to four keyways are required in a single workpiece. The milled slots in the broach body, which contain the cutting blades, are accurately located at 90° intervals.

Designed for use with hydraulic, air, or hand-operated presses, Glenny LK-4 broaches facilitate production cutting

of multiple keyways. The 1" diameter broach illustrated below is being used to cut four 1/4" wide by 1/8" deep keyways in one pass through the workpiece. Four separate cuts formerly were required to do the same job.

Glenny LK-4 broaches can be furnished on order in diameters from 3/4" to 2 1/2", in 1/32" increments. Blades widths range from 3/16" to 5/8", depending upon the broach diameter. Interchangeable blades facilitate cutting of different size keyways with one tool. In addition, when blades are removed for resharpening, replacement blades can be substituted to prevent slow-down in production operations.

LK-4 broaches feature fully-protected cutting blades, absolute centering in minimum time, chatter elimination, and simple over-all operation, according to their manufacturer.



George R. Weber was elected treasurer of Raybestos-Manhattan, Inc., Passaic, N. J., at the annual meeting of the Board of Directors recently, succeeding W. H. Dunn, who has retired. W. S. Simpson was elected secretary, and W. Ward Kievit a director of the corporation.



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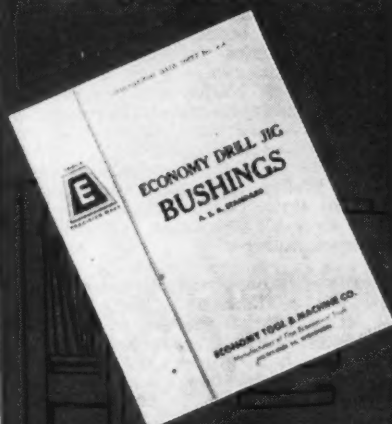
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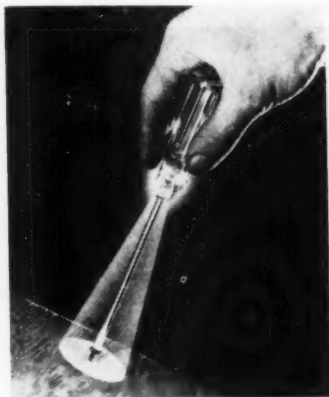
## Economy

### TOOL & MACHINE CO.

1829 S. 68th St., Milwaukee 14, Wis.

## Screw Driver with Built-In Flashlight

A screw driver that lights up the head of a screw obscured by shadows or completely blanked out by darkness, is announced by Vaco Products Co., 317 E. Ontario Street, Chicago, Illinois. It has a handle containing a flashlight bulb, battery, and directional lucite lens, thus enabling the user to throw a circle of bright light onto the work where needed and as long as desired. The flashlight operates by turning a knurled knob in the handle dome; it will remain illuminated until switched off. This knob does not interfere with manipulating the screw driver.



Called the Amberyl Flashlight Screw Driver, the handle of this tool is constructed of break-proof, shock-proof, fire-proof Amberyl and is designed for comfort under long periods of usage. The deep flutes provide easy vacuum grip, while all flute edges are chamfered to prevent hand soreness.

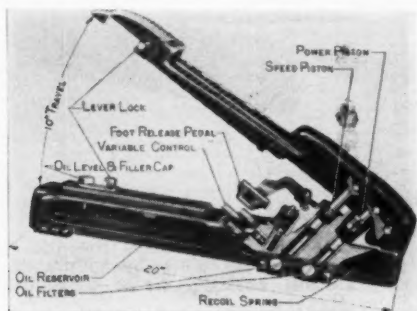
The standard blade is of forged chrome durable Vanadium. A long-life bulb and regular pen light dry battery, are easily replaceable.

Vaco Amberyl Flashlight Screw Drivers come in three convenient sizes. Model No. FL-24 has an overall length of 7 $\frac{1}{2}$ " with a handle 1" x 3 $\frac{3}{8}$ " and a blade  $\frac{1}{8}$ " x 4". The No. FL-34 Model is 8 $\frac{3}{8}$ " in length, with a handle 1" x 3 $\frac{3}{8}$ ", and a blade  $\frac{3}{16}$ " x 5", for slotted screws, and No. PFL-1 with a  $\frac{3}{16}$ " x 5" No. 1 Phillips bit for cross slot screws.

The Vaco Amberyl Flashlight Screw Driver is useful to garage and auto mechanics, laboratory technicians, workers on assembly lines, testers, inspectors, machinists, and all those interested in a fine, double duty tool.

## Foot-Operated Hydraulic Jack

The "Go-Jak" pump unit is a precision made tool developing up to 20 tons pressure. It is suitable for the assembly or disassembly of large parts, force fitted parts, and other machine shop and repair shop applications. The Go-Jak can



also be adapted to, or built into, existing machinery. It has compact size, high pressure range, and simple operating features. The Go-Jak is a recent development of Wihl Industries, Lewis St., Eatontown, N. J.

Since the Go-Jak is foot operated, both hands of the operator are free to do the work normally requiring an assistant. Both the pumping and releasing phases of operation are under foot control at all times.

This new hydraulic jack is provided with two speeds. A patented selector valve allows the operator to choose the right speed and capacity to suit the occasion. With the selector valve in the "out" position, the foot pedal will force the ram out quickly until the work is touched. The unit then changes automatically from high to low speed to take advantage of the full capacity of the ram. For light work, the selector valve can be set to the "in" position and the jack will operate at high speed constantly.

All working parts are made of high grade, heat treated, polished and ground steel. Bulky parts are of cast aluminum alloy. This extensive use of aluminum brings the total weight of the jack down to 10 lbs., including the oil. The unit is made for  $\frac{3}{8}$ " male pipe threaded fittings. An auxiliary  $\frac{3}{8}$ " pipe threaded hole is available for such application where a larger reservoir of oil is required.

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Send us samples for grooving. We will return them cut to specifications, with a record of time and cost estimate. No obligation.

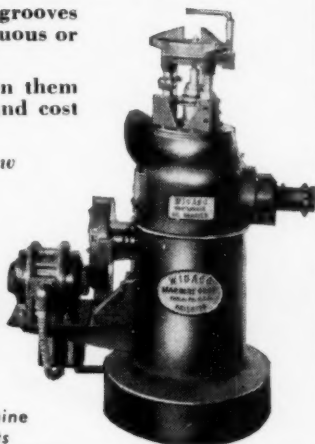
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You Can Improve Your Production.*

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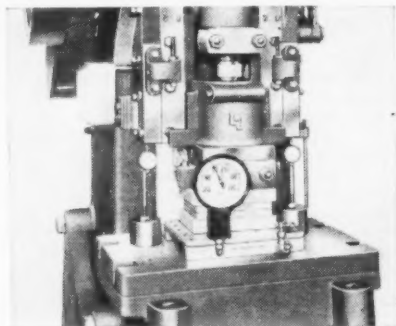
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Precision Internal Grinder—Screw Machine Products



### Punch Presses Tested In Action

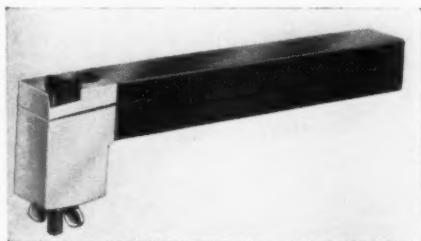
Users of punch presses who are concerned with the accuracy of stampings and die life will be interested in the Punch Press Tester developed by the L & J Press Corp., Elkhart, Indiana. This ingenious unit consists of a hydraulic device, with a recording gauge, that is placed on the press bed to measure the pressure in tons that is exerted by the ram, either directly, or through a die. At the same time, dial indicators located at both sides of the bed and contacting the gib ways measure any frame deflection. This permits an accurate determination of any frame deflection at any ram pressure, as well as the ram pressure being applied on any particular job.



Frame deflection is highly important to punch press users as it causes die misalignment which results in inaccurate stampings and decreased die life. L & J Press reports that this tester has been invaluable to them in their research and testing as the designing of press frames based upon customary formulae alone cannot eliminate the need for measuring deflection under actual working conditions.

### Super Ejector Tool Holders

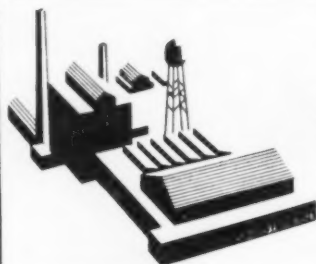
Hard chrome plating of the heads of the new line of standard Ejector Tool Holders for solid carbide inserts is announced as a design feature of these new holders by Super Tool Company, 21650 Hoover Road, Detroit 13, Michigan.



Chrome plating increases the life of the holder up to 500% by eliminating chip erosion, according to M. J. Steffes, Sales Manager.

The new design features include a new method of clamping that gives controlled clamping action and stress-free, rugged support of the blade. A locking screw on top of the holder is easily accessible for fast insert interchange without removing the holder from the tool post. A wing nut on the bottom eliminates the need of a wrench in locking the adjusting screw. A knock-out hole for easy removal of the insert is provided. The elimination of offsets and excessive overhangs permits adjacent set-up of the holders.

In redesigning their Ejector holders, Super has retained such important features as durable, heat treated alloy steel shanks; broached holes that fully enclose the insert and give perfect support and rigidity; no separate parts or clamping devices to break, become lost or complicate the set-up.



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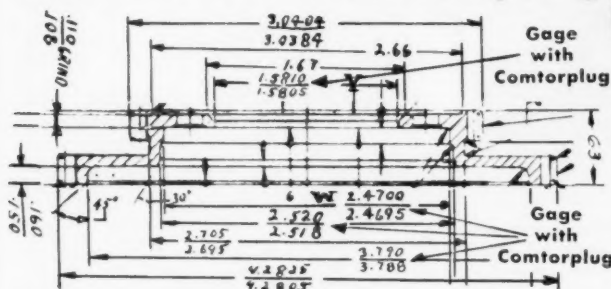
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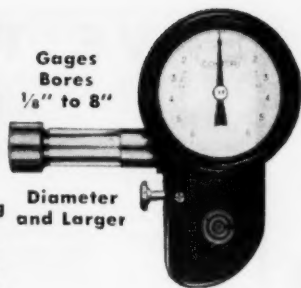


THE ALPHA CORPORATION  
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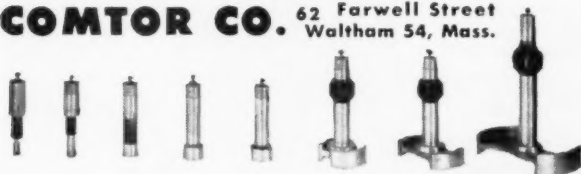


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Patented Comtorplug makes all internal gaging easy. Automatic features assure true 2-point contact, at any part of hole. Shows actual size (not a passing reading), front or back taper, out-of-round, etc. Gages shallow holes or to bottom of deep blind holes.

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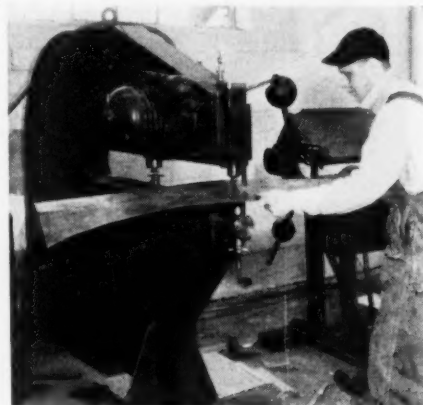
## New Shear Eliminates Feeding and Turning Resistance

The new Baker Tru-Edge Shear, capable of cutting irregular shapes in either mild or stainless steel sheets up to 3/16" thick is now in production at Baker Brothers, Inc., 1000 Post St., Toledo 10, Ohio. The shear is designed to meet exacting requirements and will shear practically any material within its capacity, including mild steel, stainless steel, aluminum, brass, copper and magnesium. An attachment for circle cutting and strip cutting is provided, and the shear may also be used to cut to a scribed line or by template.

No starting hole is required for inside cuts. By an exchange of hammer type dies for the cutting tools, the same machine will do diverse beading and forming operations in steel up to 1/8" thick. Because the machine actually shears the metal, rather than removing any, a smooth, burr-free edge results, eliminating costly finishing operations.

The shear is made with a 48" throat, a variable stroke adjustment, and is powered by a 1 1/2 h.p. totally enclosed ball bearing, 220/440 volt, 3 phase, 60 cycle motor. The only moving parts are one roll crank, two rollers, and a reciprocating

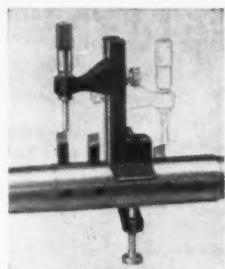
top tool holder, resulting in minimization of maintenance costs and complete dependability. Standard equipment



includes lamp, circle cutting attachment, and one set of cutting tools. Special motors to run on any other power source will be quoted on request.

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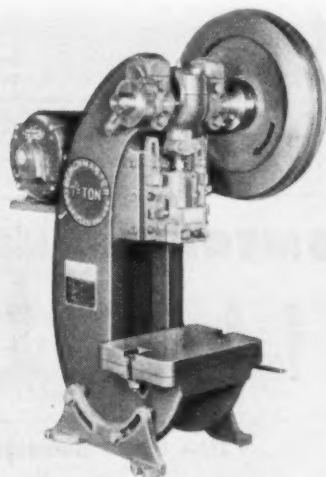
**NIELSEN, INC.** LAWTON, MICH.



## New Benchmaster 7½-ton Press

A new 7½-ton Punch Press is announced by Benchmaster Manufacturing Co., 2952 W. Pico Blvd., Los Angeles 6, Calif., to augment the 1-ton and 4-ton standard and deep-throat Benchmasters.

The new press is designed to cover a range of press uses; the shut height has been increased to 9" (ram up, to bed).



This oversized die capacity does not hamper the use of standard size die sets, but gives almost 200% more vertical die space—an advantage with the ever-increasing use of complex dies of semi- or fully automatic nature. This extra capacity also is said to aid adaptations of roll and hopper type feeding devices and to facilitate tricky operations at high production rates.

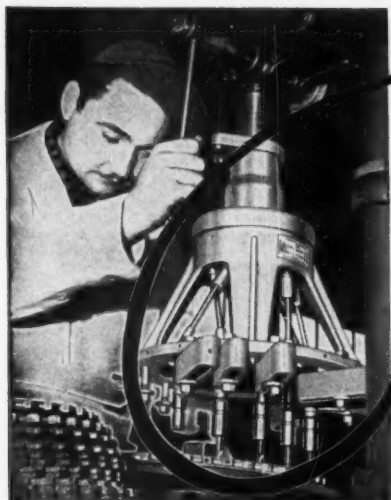
The ram has been equipped with a 1-9/16" diameter shank hole, since the 1-9/16" diameter shank die sets are almost universally used and are available at a slightly lower cost. This size lends itself to interchangeability with a wider range of press applications as well.

A wide variety of stroke lengths can be secured for using the press on out-of-the-ordinary jobs. The standard stroke furnished is 1¼"; special strokes up to 2½" are available.

To augment the increased throat area, the bolster plate measures 8"x11", providing ample working space for all requirements. To accommodate special jobs, the bed is equipped with a 4"x5" rectangular opening for bottom ejection.



# MULTIPLE DRILLING with a . . .



## MULTI-DRILL

Increases Capacity  
Up to 800%

ADJUSTABLE TO ANY HOLE PATTERN  
FITS ANY DRILL PRESS

If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern — is compactly built to permit easy, unhampered operation with drill jigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as  $\frac{1}{8}$ " — handle drill sizes up to  $\frac{3}{8}$ " in steel. Special adaptations available.

There is a Commander MULTI-DRILL Distributor in your area. Write for his name, literature and complete details.

**COMMANDER MFG. CO.**

4227 West Kinzie St.

Chicago 24, Illinois

Product of *Commander* — Builder of the *Commander Tapper*

### Air Pressure Device for Rocker Arm Type Spot Welders

A small, compact, self-contained unit is now available to add the advantages of air-pressure operation to regular foot-controlled rocker arm type spot welders. The unit is named Weld-Air-Matic, and is manufactured by the Robt. W. Hoffman Co., Inc., 32 S. Clinton St., Chicago 6, Ill.

The Weld-Air-Matic clamps to the upper horn of conventional rocker arm spot welders. It operates on a reduced air pressure of 15 to 50 lbs., depending on the particular requirements of the welder. Eliminating the necessity of all rocker arm movement, the Weld-Air-Matic operates through a maximum stroke of  $1\frac{1}{2}$ " on size 1 welder, 2" on size 2, and  $2\frac{1}{2}$ " on size 3. A feather touch electric foot switch controls the air pressure, energizing a coil on a four-way operating valve. The unit is designed to operate in conjunction with any standard weld timer control, and requires at least four cubic feet of air supply per minute, with a minimum of 80 lbs. line pressure.

All accessories are mounted on one strong, aluminum alloy casting. Wearing

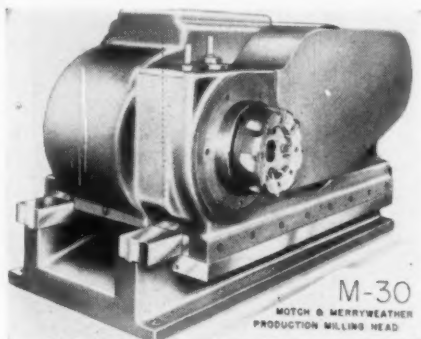


parts are oil sprayed, and there is a grease fitting for piston rod and bushing lubrication.

### M & M Production Milling Head

A new milling head for production milling is introduced by The Motch & Merryweather Machinery Co., 715 Pen-ton Bldg., Cleveland 13, Ohio. This new head has had all gears integral or mounted solidly by taper and key, to lock them in place on the shafts. Adjust-ment of the steel quill up to 2" for cut-ter wear is obtained by an Acme thread, and the movement gauged by a microm-eter dial. A flywheel effect is obtained by a large, heavy spindle gear mounted

solidly on the spindle. Lubrication in-side the head to all bearings and gears is positive by a geared pump. Automatic lubrication is provided for the hardened steel ways.



### ADACK INSTANT-ADJUSTING



Set them with one hand instantly for any gap from wire size to more than two inch opening. Ideal for water pumps, crank case plugs, brake cams, pipes, etc. High quality chrome vanadium steel, 9½ inch length for ample leverage. Double-pivot action for increased **parallel jaw** power. Normal hand gripping at all jaw openings.

Ask your dealer or order direct by check or money order. (No C.O.D.'s, please). Price postpaid anywhere in U.S. \$3.50.

**R. CALUWAERTS CO., INC.**

1 West 67 Street New York 23, N. Y.

Although this milling head is arranged with a single speed for production work, using either high speed steel or tungsten carbide-tipped cutters, change gears can be provided. The manufacturer claims that the features of this new mil-ling head provide the necessary rigidity and horsepower at the tool point to give excellent results with carbide tools. The new head can be adapted to special pro-duction milling machines that can also provide for other simultaneous machin-ing operations.

### New Elmes Press for Alkyd Resins

A special line of molding presses, de-signed to handle the new low-pressure, fast-setting alkyd resins to the fullest advantage, is announced by the Elmes Engineering Division of American Steel

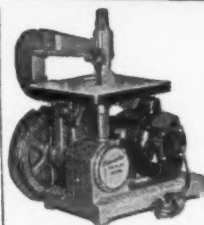


## THE MULTIFORM BENDER

PRODUCES — Springs, Stampings,  
Wire Forms, Brackets, Bus Bars,  
Clamps, etc. AT A PROFIT.

No Special Tooling

**J. A. RICHARDS CO. KALAMAZOO MICHIGAN**

**MILWAUKEE****DIE FILERS  
PROFILE GRINDERS****Embody Many Improved Features**

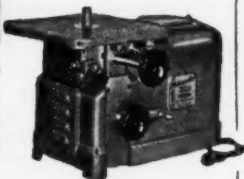
... features that result in higher efficiency, improved operating convenience and, most important, lower costs in your filing, sawing, lapping and grinding operations.

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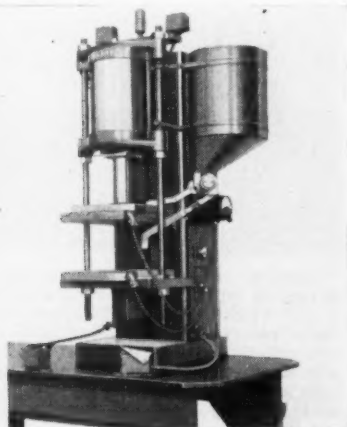
**RICE PUMP & MACHINE CO.**

1027 S. 40th St.

Milwaukee 15, Wisconsin



Foundries, 1150 Tennessee Ave., Cincinnati 29, Ohio. In developing the new "Minimatic" (miniature-automatic)



Presses, Elmes Engineers worked in close cooperation with a prominent manufacturer of the new mineral-filled molding compound.

The Elmes "Minimatic" Presses are small in size and simple in construction. They are designed for maximum flexibility of application and high-speed, low-cost production. Five cylinder capacities—3-ton and 6-ton for air application, and .6-ton, 1.2-ton, and 2.4-ton for hydraulic service are provided. All cylinders are interchangeable in the basic frame. The basic press incorporates the necessary controls for completely automatic, continuous operation or semi-automatic, single-cycle control where insert molding is done.

In the air cylinders, operation is double-acting. However, by use of a three-way operating valve with hydraulic cylinders, constant air pressure returns the cylinder upward, resulting in considerable power savings.

Harry Oldham has been appointed foundry superintendent for Hunt-Spiller Manufacturing Corp., Boston, according to an announcement by A. J. Edgar, general manager. Appointment of R. G. Fredette as production manager and Malcolm Valentine to the position of superintendent of inspection and quality control was also announced.

**NEW Pioneer Foot Switch  
SAVES TIME!**

Allows machine operators freedom of both hands. Model FS-50 shown is momentary contact type, has BX clamp, is rated 12A-125V or 6A-250V, AC-DC. Other ratings, models available — also special switches made. Send "specs", requirements, for quantity discounts.

**PIONEER PATENTS & PRODUCTS CO.**

Dept. B - 25 N. Franklin St. - Chicago 6, Ill.



Model  
FS-50  
\$5.95

## YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, inches	Opens inches	Weight Pounds
1D	3½	3½	12½
2D	5	5½	23

Do you need a vise of ANY type?

*Write today for bulletins on the extensive Yost line*

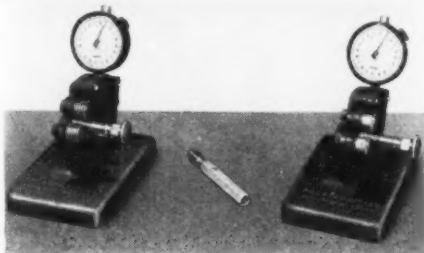
**YOST MFG. COMPANY**

1335 SO. MAIN STREET  
MEADVILLE, PENNSYLVANIA

## P & W Tri-Way Thread Comparator

Rapid and accurate checking of male threads is made possible by the new Tri-Roll Thread Comparator now being produced by Pratt & Whitney, Division Niles-Bement-Pond Company, West Hartford, Conn. The instrument may be operated with a minimum of skill and requires no computations or auxiliary equipment.

Externally threaded parts to be measured are cradled between two stationary gaging rolls and a third roll, mounted on a preloaded armature, is swung into contact. A dial indicator graduated in increments of .00025" gives cumulative readings of errors in lead, angle and pitch diameter.



Gaging rolls are form ground in a series of annular ribs. Where a check on pitch diameter only is desired, rolls with only two ribs are used. These ribs are truncated to 3/8-pitch flat on their major diameter and cleared in their minor diameter. When arranged with two-rib rolls it may be used for checking the pitch diameter of three-fluted taps.

Initial setting is established with a setting plug, after which the exact amount of deviation in oversize or undersize threaded parts is registered on the dial. Thus Classes 1, 2, 3, 4, and 5 American National Threads or Classes 1A, 2A and 3A Unified Threads may be checked from the same initial setting.

Within the range of each gage, the gaging rolls can be easily changed for another diameter or pitch. The rolls rotate freely, minimizing contact surface wear, and can be reground should they become slightly worn. By transposing the two bottom rolls in the comparator, either right or left hand threads may be checked.

Because of its three-point contact principle, the Tri-Roll is self-cleaning, permits unobstructed visual inspection, and detects out-of-round conditions and dented threads.

## MARVECO Live Centers



- HEAVY DUTY
- LONG LIFE
- HIGH SPEED

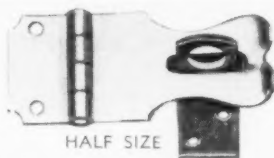
MARVECO is the time-tested live center with unlimited capacity—50 pounds to 50 tons... guaranteed to outperform and outlast any other live center. You can depend on MARVECO for trouble-free production.

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SEND US YOUR CENTER PROBLEMS

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HALF SIZE

HASP & STAPLE



WITH OR WITHOUT HOLES

Butts and Continuous Hinges for Cabinets, Cases, etc.

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CHICAGO 51, ILLINOIS

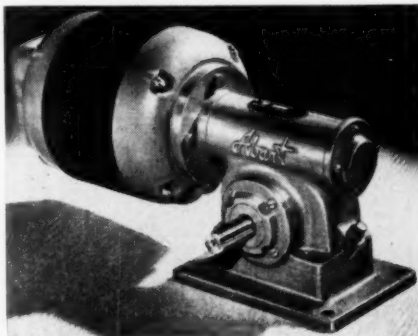
### Abart Right Angle Gearmotors

Abart Gear & Machine Company is now manufacturing gearmotors of right angle type single-phase and three-phase models at its plant, 4828-36 W. 16th St., Chicago 50, Ill. The motors are of heavy duty type, NEMA rated. The entire unit is designed for manufacture on the latest most accurate high production, with long trouble-free performance.

Standard speeds and ratios are as follows: (other speeds and specials are available on application). Horsepower 1/6 to 5; ratios 5-4/5:1 to 100:1; output speeds from 17.5 r.p.m. to 302 r.p.m. Special voltages, cycles, etc., are furnished on order. Mounting is one single surface. Units can be mounted in any position. Torques are all taken by semi-steel gear case. Gears are of nickel bronze. Worms are integral with shaft, hardened and precision-ground. Ball bearing are perfectly spaced and neoprene sealed. Shafts are of special tough alloy steel (180,000 to 320,000 tensile), ground. Insulation is long-life baked varnish. Enclosures may be drip-proof, totally enclosed, or fan-cooled, optional.

Brakes are optional. The durable housing is semi-steel precision machined, for strength and resistance to dirt, grit and corrosion.

A bulletin giving sizes and ratings on



single-phase and three-phase models will be sent on request on company letterhead, to the above address. Ask for Bulletin B250.

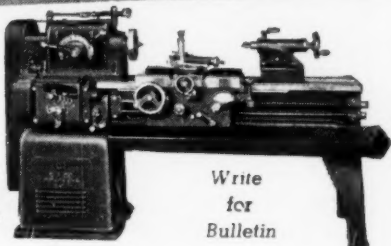
**CARROLL and JAMIESON**

*Lathes*

12 Speed Geared Head  
Motor Drive Timken Mounted  
Spindle.

Modern Design —  
Liberal Dimensions.

**Carroll & Jamieson Machine Tool Co.**  
BATAVIA, OHIO, U.S.A.



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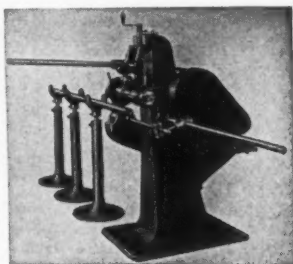
## AUTOMATIC CHUCKING AND INDEXING FIXTURE



- 1.—1800 light cuts per hour.
  - 2.—Either horizontal or vertical position
  - 3.—Collets changed instantly.
  - 4.—Automatically knocks piece out.
- Model D—Ratchet indexing only—1" cap  
Model E—Both degree and ratchet indexing  
—Capacity up to 1"  
Model F—Both degree and ratchet indexing  
—Capacity up to 2 1/4".

Write for Folders

J. W. DEARBORN • Ansonia, Conn



## Faster TUBE & PIPE CUTTING

Steen High-Speed pipe, tube and column cut-off machines embody unique design and rigid construction features to greatly step up cut-off operations. Available in three sizes to cut diameters 1/8" to 3"; 1/8" to 6"; 3" to 12".

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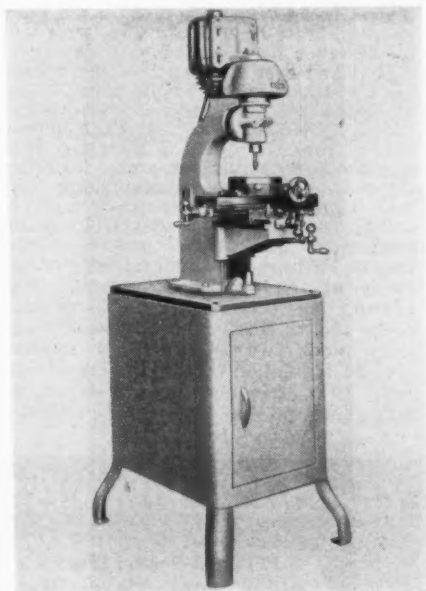
**Continental Machine Co.**

1954 Maud Ave. Chicago 14, Ill.

## Columbia Vertical Milling Machine with Adjustable Head

A versatile milling machine offering a wide latitude of features to meet user's specific requirements has recently been designed by Columbia Enterprises, Inc., Grayslake, Ill.

The No. 1 Columbia Vertical Milling Machine is a sturdy, precision machined unit which will maintain tolerances up to .001". Milling, drilling, boring and routing can be done at any angle, since the adjustable swivel head will turn on a 180° radius. The spindle is equipped with tapered Timken bearings maintaining spindle alignment and carrying radial and thrust loads, transmitting smooth maximum power to the cutter at any angle. A variety of spindle speeds plus easy set-ups make the unit adaptable to tool and die rooms, and for production, maintenance and experimental operations.

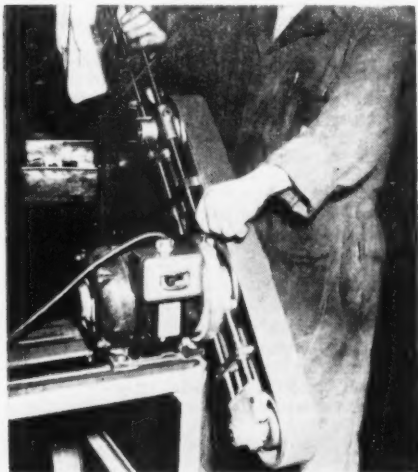


The standard unit is a bench model, illustrated, completely arranged for motor drive, with motor pulley and V-belt. Optional equipment includes a floor stand with built-in cabinet, a 6" layout table, a 4" swivel base vise and a single phase, 1750 r.p.m., 1/3 h.p. motor.

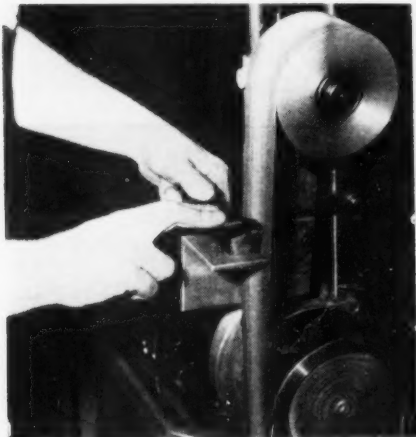


## Belt Grinder Economizes on Clean-up Operations

An ingenious abrasive belt grinder has been designed to cut costs on many secondary and clean-up operations in the various departments of metal-working, woodworking and other plants. It is a recent product of Abrasive Machine Co., Naperville, Ill.



With this unit beside milling machine operators, they can deburr, remove cutter marks, break corners, etc. It can be set alongside of band or hacksaws and used to clean up tool marks, round out contours, and deburr. By placing the abrasive unit with automatic feeding



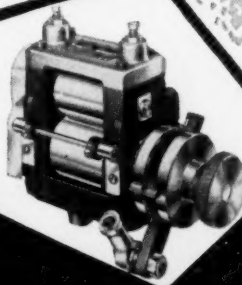
next to an automatic, the operator can handle clean up jobs between cycles of the production machine.

The abrasive unit is mounted on an axis that centers at the motor shaft, and with one turn of a clamp nut the abrasive belt can be set at any angle in a complete 360° arc. Several units can be set above each other so that their contact wheels or platens may be directly in front of the operator. With this set-up, the worker can rough, semi-finish, and finish grind with no waste movement.

The abrasive grinder can be used for free belt operation, form wheel work, contour grinding, line contact grinding for hogging operations, or for platen precision grinding either above or below.

The front contact roll is made of aluminum, and a drive belt serves as a resilient. An advanced feature of this machine is the driving wheel, which is centered at the motor shaft. This wheel drives the belt which is looped over two idler pulleys at each end. In conventional belt machines one of the idler pulleys serves as a driver, resulting in frequent belt slippage; this is completely eliminated from the present unit.

### A REALLY VERSATILE ROLL FEED \$129.50



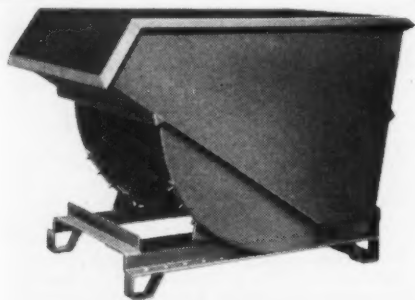
Quality built for long, dependable service. Models available to fit all size power presses.

Write today for circular and prices.

**ROLL FEEDS CORP.**  
PAWTUCKET • RHODE ISLAND

### Palmer-Shile Automatic End Dump

The Automatic End Dump for use with lift trucks is a new product just announced by Palmer-Shile Co., 12648 Mansfield St., Detroit 27, Mich., manufacturers of all types of material handling equipment.



Manufacturing plants and foundries can speed up production and save man-hours with this new equipment which features simpler dumping by a smooth-operating rocker geared to a track. The device locks during loading by means of

a safety latch. It can be built for either lift or fork truck and with casters that provide easy moving around machinery and through narrow aisles. The End Dump is stated to be ideal for handling and dumping sand, castings, scrap, stampings and other heavy materials. It is of all-welded construction, and built of heavy steel plate reinforced with heavy angles.

### Handy Pads for B & S Screw Machine Tools

A new line of standard tools for Brown & Sharpe automatic screw machines, consisting of five types of cut-off tools, two chamfering tools and form tool blanks in both regular and high speed steel, has been introduced by Brunette Tool Co., 112 Stanley St., New Britain, Conn. For use in ordering the right hand, left hand, double radius and cut-off, and chamfer tools are the new Handy Pads, said to be unique among manufacturers of standard tools.

The Handy Pads are printed with boxes for filling in or eliminating any dimensions, radii or angles, also an order blank for including machine size, the quantity required, and the grade of steel. The prices on Handy Pads are given singular, 2 to 6, and 7 or more, for both grades of steel. These useful pads are completely described in a 6-page circular which is available upon request to the manufacturer.

The Durant Manufacturing Co., Milwaukee, Wis., announces the appointment of Ellsworth W. Crane as Mid-West regional sales manager.

Appointment of Harold M. Winton as director of training for the mechanical goods division, United States Rubber Company, has been announced by Ernest G. Brown, vice president and general manager.

**SOLD THRU LEADING SUPPLY HOUSES**



### GROBET CHATTERLESS COUNTERSINKS

Six staggered cutting edges give shearing cut that eliminates all chatter.

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421 Canal Street N. Y. 13, N. Y.

## KENNAMETAL CUTTING TOOLS

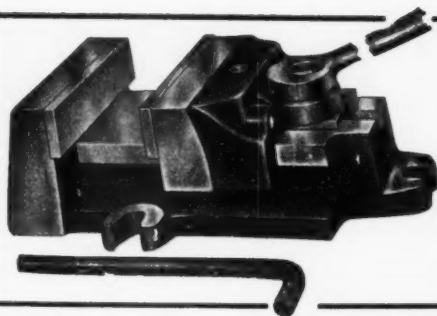
for Increased Productivity

**KENNAMETAL Inc.**  
LATROBE, PA.



**CEMENTED CARBIDE TOOLS,  
BLANKS, MILLING CUTTERS**





### PLUNKET QUICK ACTION VISE for DRILL PRESS or MILLING MACHINE

Designed for production work, using an eccentric motion to apply pressure to jaws.

Eccentric motion moves jaw 5/16".

Size 6" jaws, 1 1/2" deep, opens 4".....\$63.00

Pressure between jaws, with handle furnished, 2200 lbs. Net weight 36 lbs.

Our complete line includes Vises for Drill Presses, Milling Machines, Shapers, Grinders

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J. E. Plunket Machine Co. 1823 W. Lake St.  
Chicago 12, Ill.

### BROKEN TAP TROUBLES? LET WALTON TAP EXTRACTORS

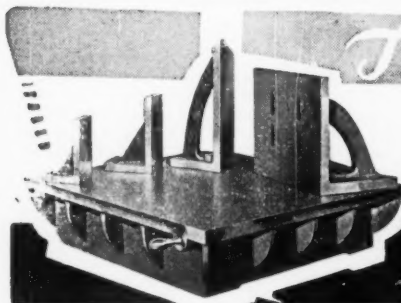
SOLVE YOUR PROBLEM QUICKLY

No need for bulky, expensive equipment. Keep a set of inexpensive Walton Tap Extractors on hand for these emergencies. They're time tested and shop proven.

Purchase from your dealer or write us for descriptive folder No. 12.

**THE WALTON COMPANY**

HARTFORD 10, CONNECTICUT



### MILWAUKEE EQUIPMENT FOR TESTING AND CHECKING

Over twenty years of experience gives you "proved" performance — added assurance of quality production. Milwaukee Surface Plates, Angles, Parallels and Straight Edges are all made of the highest quality semi-steel and finished to exact dimensions.

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**J. C. BUSCH COMPANY**

Engineers and Machinists Since 1907

165 S. BARCLAY ST. • MILWAUKEE 4, WIS.

**Air-O-Check**  
THE VALVE WITH  
THE INTERNAL  
FULCRUM LEVER

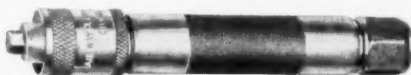
### AIR GUNS— THAT LAST AND LAST . . .

For blowing chips from work — For cleaning out hollow sets, machine recesses and tee slots — For

drying parts before inspection and for many similar uses, Air-O-check is the Air-gun.

The internal fulcrum lever is a basic design in all Air-O-check Airguns, Sprayguns and Casing Valves.

Write for details



**AIR-WAY PUMP & EQUIPMENT CO.** 1054 N. KILBOURN AVE.  
CHICAGO 51, ILLINOIS

# PRECISION BUILT MACHINIST VISE

Enclosed design prevents chips and dirt from entering internal parts. The balanced motion of a fine threaded spindle, moving freely in an ingeniously anchored sleeve type nut, eliminates dead motion and strain on moving parts. Head moves in precision broached keyway. Complete size range of bench and combination pipe vises. Before you buy, write for our descriptive catalog and give us the name of your preferred distributor.

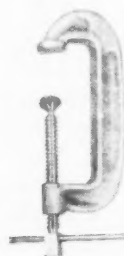
• 5 YEAR GUARANTEE •

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925-E Wrightwood Ave., Chicago 14, Ill.

# WILTON

THE FINEST NAME IN VISES



**"C" CLAMPS**  
OF PEARLITIC  
CASTINGS — tensile  
strength up to 80,000  
P. S. I. — lower in  
price than forged  
clamps yet equally  
efficient.

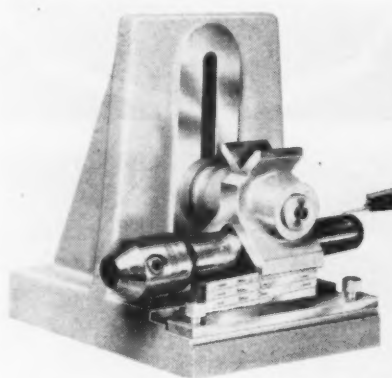
## New Taper Measuring Fixture

The new Webber Taper-Chek simplifies the job of inspecting tapers. Long and tedious set-ups are eliminated; instead of using comparator, sine bar or spaced roll, the operator simply assembles the proper combination of angle blocks. The blocks are then mounted with the work on the Taper-Chek and an indicator reading is taken. It takes less than two minutes and the taper is checked to within .00002" in 4". The device is manufactured by the Webber Gage Co., 12900 Triskett Road, Cleveland 11, Ohio.

This fixture is designed only for use with Webber Angle Blocks and cannot be used with a sine bar. It consists of a base and three V-blocks capable of holding and measuring any standard taper up to No. 50 milling machine taper, plus any special taper in that size range.

The Taper-Chek eliminates cross checking, comparing and reconciling differences that sometimes arise with conventional methods. It gives the same

answer wherever used. The method is obtained by direct reading on angle blocks. Errors in the use of the sine bar tables and variations in method are eliminated. There are no calculations, no



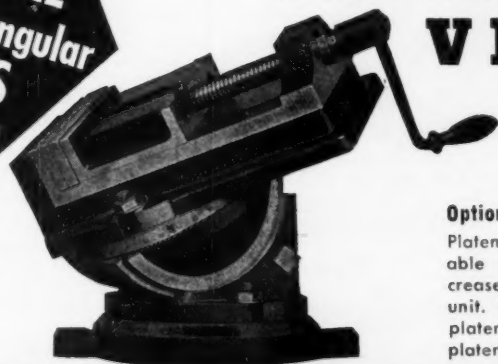
sine bars, no knife edge and no chance of error due to compounding of angle.

**SAVE TIME**  
on intricate, angular  
**SET-UPS**

## Master Multi-Swivel **WISE**

Fully universal . . . 3 swivels simplify setting of compound angles. Parts interchangeable. . . .

Can be used as a plain flanged vise, swivel vise, multi-swivel vise.



### Optional Accessory

Platen, interchangeable with vise. Increases capacity of unit. Uses as plain platen, multi-swivel platen.

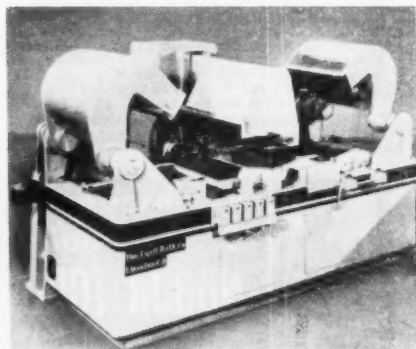
## DONOVAN MANUFACTURING COMPANY

80 BATTERYMARCH ST.

BOSTON, MASS.

### Tangent Bender Forms 125 Units Per Hour

The machine illustrated below is a new Four-Wing Tangent Bender, recently developed by the Cyril Bath Company of Cleveland, as an addition to their line of metal forming machinery. It was developed for the production of outer cases for automatic washing machines.

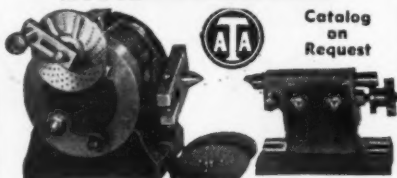


In operations, blanked and punched sheets are fed end-wise into a clear space in the center of the machine. At the press of a button a series of automatic

operations is begun: first, the center ram and the two rocking, hold-down pads, shown in upright position at right and left of the machine, descend simultaneously to hold the sheet in place. This is immediately followed by the action of two end wings, which form up the ends of the blank at the proper radius, and retract. The two hold-down pads then swing up, out of the way, allowing clearance for two concealed wings to move up and bend the front corners of the cabinet. After forming these last two corners, the wings retreat. Then the center ram, carrying the forming die, is raised at the same time the punch collapses, and the finished shell is unloaded.

This series of fifteen movements can be manually controlled, but is normally automatic and operated by an electric control panel in the rear of the machine. The entire machine measures 10' 6" right to left, 8' 4" front to back and is 6' high. It is so designed that an overhead arm can be bolted in place to provide welding devices, so that the entire case can be formed from a flat sheet, welded while in the machine and then unloaded, not having to move further into jigs or fixtures for finishing operations.

## CARROLL DIVIDING HEADS



Catalog  
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3 SIZES - 4 MODELS - 6" to 12"

**TROYKE MFG. CO.**

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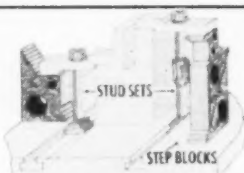
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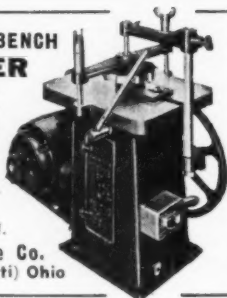
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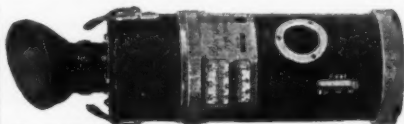
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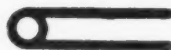
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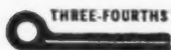
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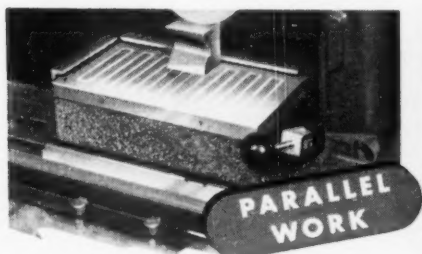


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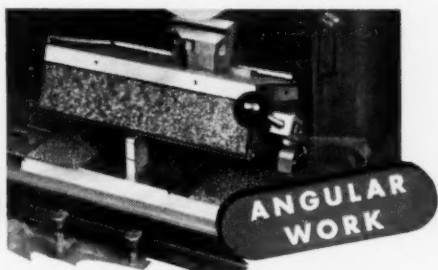


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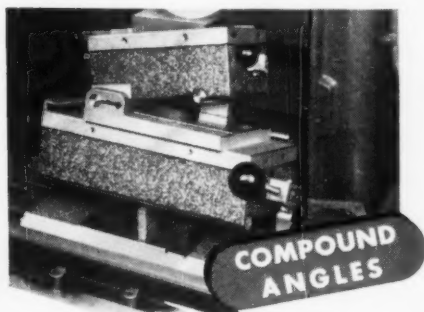
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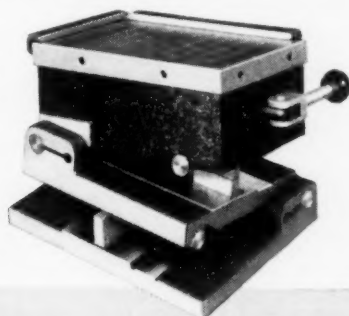
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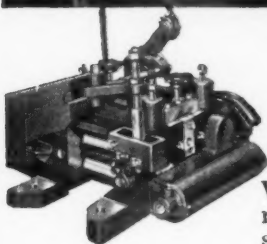


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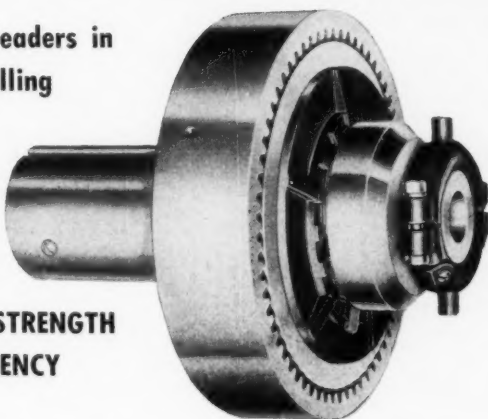
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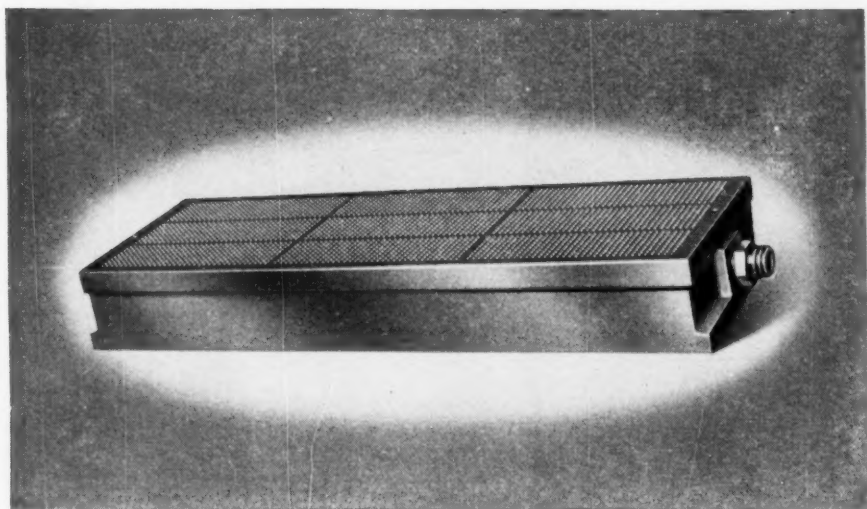
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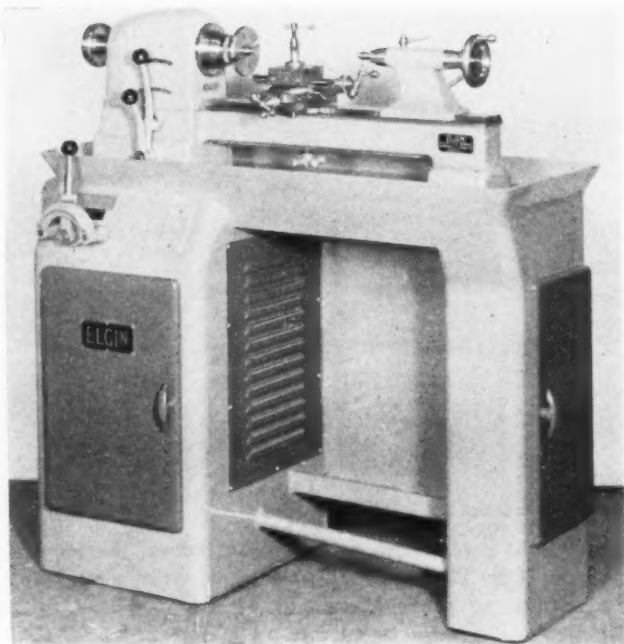
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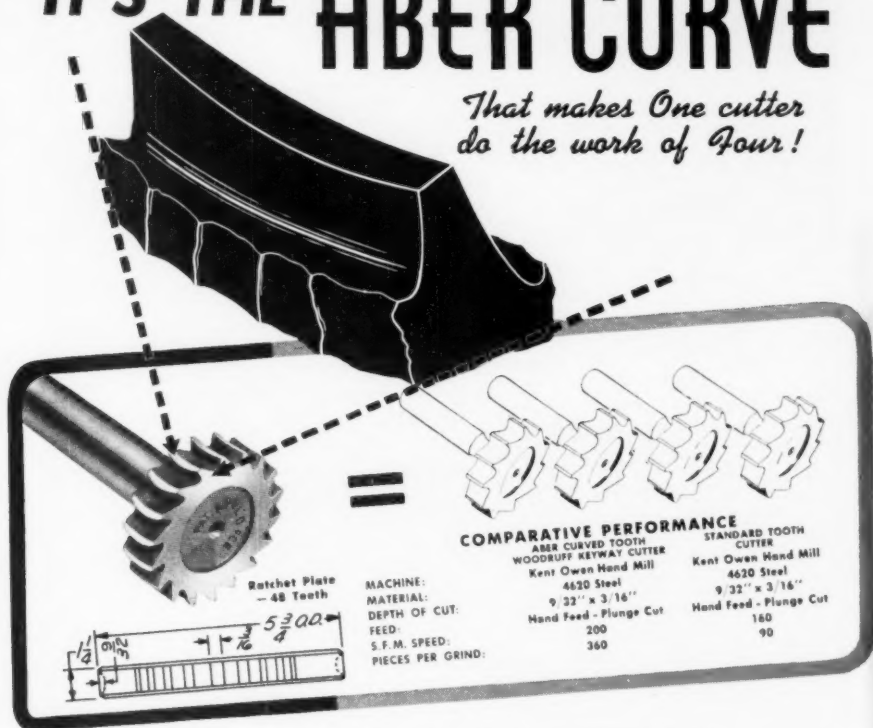
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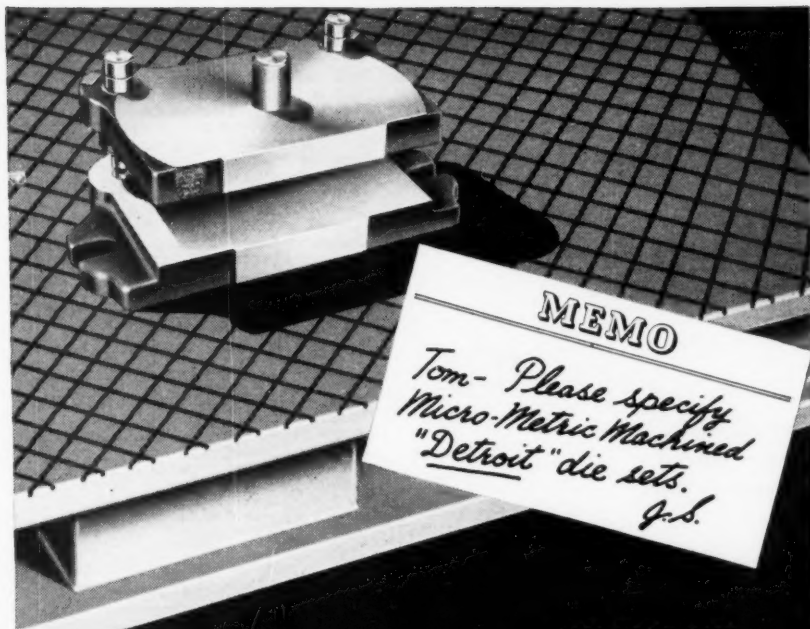
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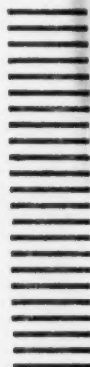
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Name..... Position.....  
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 Street.....  
 City..... Zone..... State.....

## MACHINE and TOOL BLUE BOOK

CIRCULATION DEPARTMENT  
 WHEATON, ILLINOIS

### SUBSCRIPTION FORM

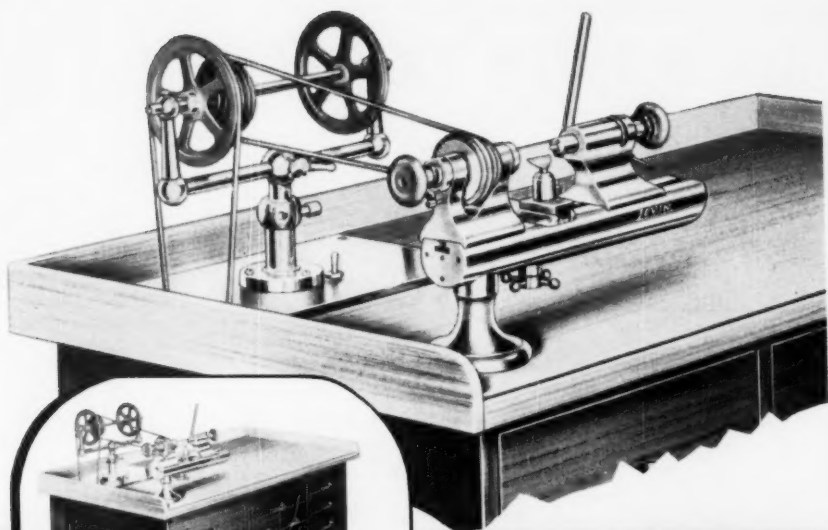
To receive MACHINE and TOOL BLUE BOOK regularly fill in below and mail this card today.

- ☐ 1 Year (12 Issues) .....\$3.00  
☐ 2 Years (24 Issues) ..... 5.00  
☐ 5 Years (60 Issues) ..... 7.50

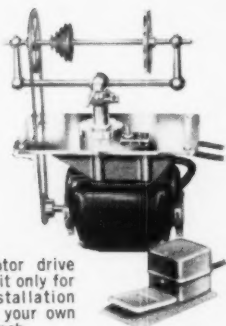
- ☐ Check Enclosed  
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Name..... Position.....  
 Company.....  
 Street.....  
 City..... Zone..... State.....  
 Products Manufactured..... No. of Employees.....

(The above information will be kept in strict confidence.)



Lathe with  
complete  
bench and  
motor drive.



Motor drive  
unit only for  
installation  
in your own  
bench.

## ***LEVIN***

### AMERICA'S FINEST PRECISION JEWELER'S LATHES

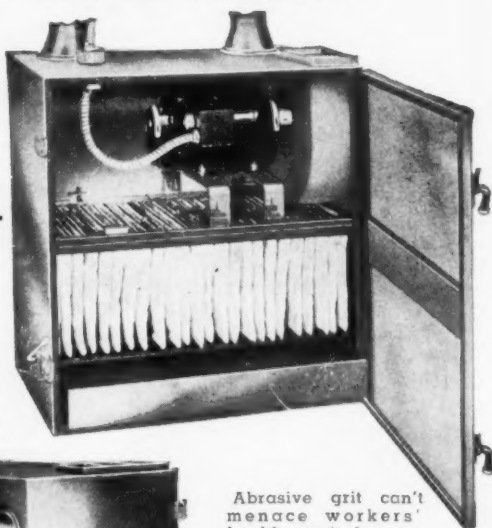
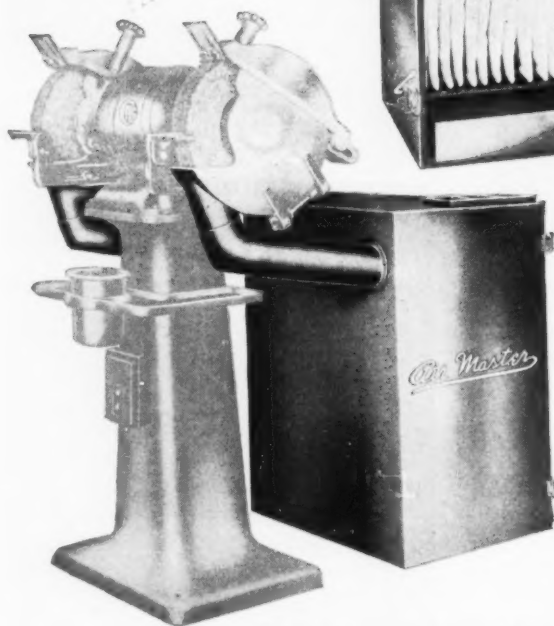
Widely acclaimed as ideal for instrument work, second operations for production, tool work or experimental work and model making. Collet capacity  $3/16"$  or  $5/16"$ .

Available with motor drive and bench or for separate mounting. Send for complete catalog and prices of lathes and accessories.

**LOUIS LEVIN & SON, INC.**  
782 East Pico Blvd.  
Los Angeles 21, Calif.

# AIR MASTER PROTECTION

## for Men and Machines



Abrasive grit can't menace workers' health. can't damage costly machinery when AIR MASTER is on the job.

Flying particles from grinders and buffers are trapped as they leave the wheel and thoroughly filtered through fabric and steel wool bags before the air is exhausted.

AIR MASTER is a self-contained unit—rugged and dependable in every detail.

Made in four sizes — fits any grinder or buffer. Your plant needs AIR MASTER protection!

Write today for Bulletin 30 GB

Manufacturers of a complete line of Electric Drills, Grinders, Buffers, Portable Tools

TRADE

*The Cincinnati*

MARK

**THE CINCINNATI ELECTRICAL TOOL CO.**

Division of THE R. K. LeBLOND MACHINE TOOL CO.

**CINCINNATI 8, OHIO, U. S. A.**

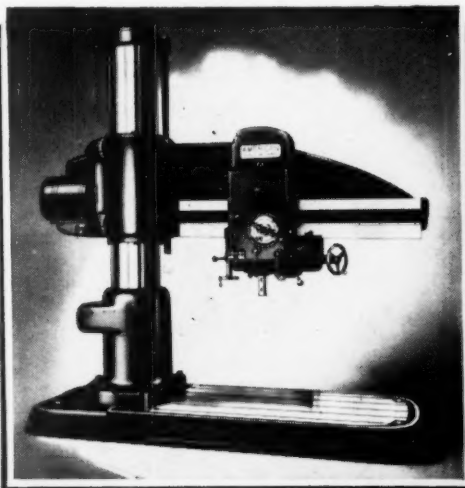
... required to produce the ultimate  
in radial drill spindles

"AMERICAN" Radial Drill Spindles are made of nitralloy. 20 hours of heat treatment from rough to finish, then 72 hours of nitriding are required to produce the wear-resistant spindles used in these radials.

Both the spindles and sleeves are nitrided to 110 degrees scleroscope. This is harder than some grades of cemented carbide. The sleeve is finish honed and the spindle ground and then diamond lapped to a sliding fit in the sleeve. Because of the lack of affinity between these two hard surfaces the clearance between them may be reduced to the very minimum, which in this case is .00025".

This results in the greatest possible stability, resulting in an ideal construction especially for accurate boring operations, which demand a high degree of smoothness and rigidity of the spindle.

This is but one of the super features that make the "AMERICAN" Hole Wizard an outstanding investment.



**THE AMERICAN TOOL WORKS CO.**

**Cincinnati, Ohio U.S.A.**

*Lathes and Radial Drills*

**CAM GRINDING  
IMPROVES COLLETS  
7 WAYS**

# BALAS CAM-GROUND COLLETS

**built by Specialists**

● There are seven reasons why you can increase the performance of your machines and do better work with Balas Cam Ground Collets.

For example, the diagrams above show how Balas Cam Ground Collets always bear on the taper regardless of whether or not the stock runs true to size, while ordinary round ground collets bear on the edges of the collet segment and tend to stick and also allow the work to chatter.

Order Balas Cam Ground Collets to be sure of getting these seven definite advantages: 1. No sticking in the chuck hood when operating with undersized stock. 2. Faster opening. 3. Tighter gripping. 4. Reduced chatter. 5. Less tendency to push stock back. 6. Chucking mechanism closes easier with lower strain. 7. Much smaller amount of breakage.

Why not get the full story on how Balas Collets can save you money? Send for latest price list and catalog now!

THE **B** LINE

**BALAS COLLET MANUFACTURING CO.**

1561 EAST 27th STREET • CLEVELAND 14, OHIO

SOLE MANUFACTURERS OF COLLETS FOR THE WORLD

BALAS COLLET MANUFACTURING CO. 1561 27th Street, Cleveland 14, Ohio

Please send copy of New Balas Catalog and Price List

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TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_





MACHINE AND TOOL

# Blue Book

HITCHCOCK PUBLISHING CO. • WHEATON, ILLINOIS • PHONE: WHEATON 8-3400

## AN IMPORTANT MESSAGE

For several years, a continuing program of publication research has been underway, insofar as MACHINE and TOOL BLUE BOOK is concerned. The aim has been to constantly improve the BLUE BOOK . . . physically, editorially and circulation-wise . . . and establish it as the No. 1 paper for advertisers who sell the metalworking industries.

During this time you and others have noticed progressive developments which included such things as:

1. Square Back Binding for ease in filing and thus assure longer reference value.
2. No Advertising on the Front Cover. This position is used to merchandise the editorial content and thus get readers into the BLUE BOOK.
3. Special Type of Binding to permit use of standard 7 x 10 plates as unbroken spreads. The BLUE BOOK lays open to the pages being read.
4. Cover Design Changed with each issue, but still retaining "family" resemblance. Fresh approach each month makes for greater reader attention.
5. New Editorial Departments to meet reader needs.
6. Special Monthly Reports on various types of machine tools.
7. Editorial Support of equipment - replacement program.
8. Circulation Checking Methods which effectively permit the right plant coverage as well as the immediate coverage of new plants.

All of these and several others were developed as a direct result of careful study . . . to make certain that these steps were progressive and would help readers and advertisers alike. Proof that this has been done is too voluminous to mention at this time.

NOW . . . our research dictates the advisability of another forward step:  
The Predating of Each Issue and a Later Closing Date.

Why?

To make it easier on the reader whose peak work period is the last few days and the first few days of each month. Plants are then the busiest in order to complete and



A HITCHCOCK

PUBLICATION

ship as many orders as possible. A number of organizations require monthly inventory reports and planning schedules. There are checks to be signed and many other details requiring the attention of management men and department heads.

Five out of the twelve months have holidays during this busy period: January 1; May 30; July 4; Labor Day; December 25. Add to this, the fact that 22 monthly industrial papers serving the various segments of the metalworking field, issue their publications from the first to the fifth of the month!

For some reason, publishers have set this period to have their monthly magazines reach the buyer when he is the busiest. MACHINE and TOOL BLUE BOOK was also guilty . . . but we decided to find out when readers wanted to receive their favorite business paper. The answer: from the tenth to the fifteenth of the month!

Beginning with the next issue, MACHINE and TOOL BLUE BOOK will be predated and issued on the tenth of each month. The issue to be distributed on August 10 will be dated September. The October issue will be in the mails by September 10, and so on. No issues will be missed . . . there will be 12 issues published in 1950 . . . 12 in 1951, etc. Each one, however, will be dated the following month.

Those advertisers whose schedules include an insertion in August will find their advertisement in the September issue. Regular September insertion orders will be included in the October issue.

Predating offers a definite advantage to advertisers in that the life of each advertisement is extended. Instead of an active 3-1/2 week life, each issue will have a minimum of 6 weeks of usefulness. First readers and pass-along readers in particular are aware of the date on the magazine they receive. They will read the latest issue. It is obvious that the issue dated September will be more attractive to them than the one dated in August. During the month shown on the cover, the BLUE BOOK will also be active. The September issues which are read in August have a 2-week bonus value to the advertiser. And the same will be true among pass-along readers in succeeding months.

The new BLUE BOOK closing date will be the fifteenth of the month preceding publication. This will give advertisers a few more days in which to prepare advertisement . . . and speed up new product announcements.

Remember, no issues of the BLUE BOOK are being omitted. The issue scheduled for August, will be dated September and will be on the desks of readers by August 10. Similarly, the October issue will be distributed by September 10.

This change in publishing dates will help to maintain MACHINE and TOOL BLUE BOOK as the REaD Book of the industry.

MACHINE and TOOL BLUE BOOK

VCH:b